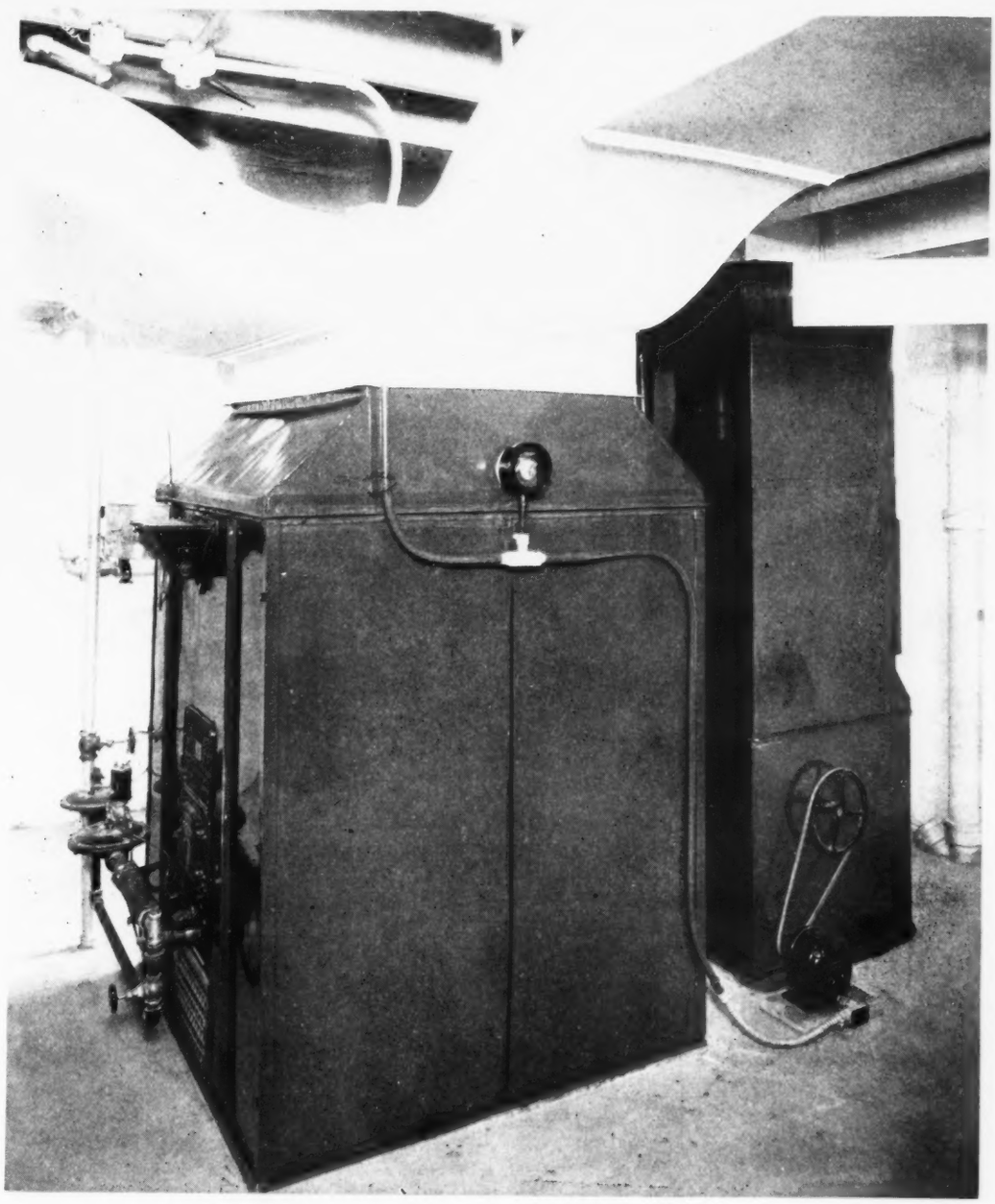
American Artisan

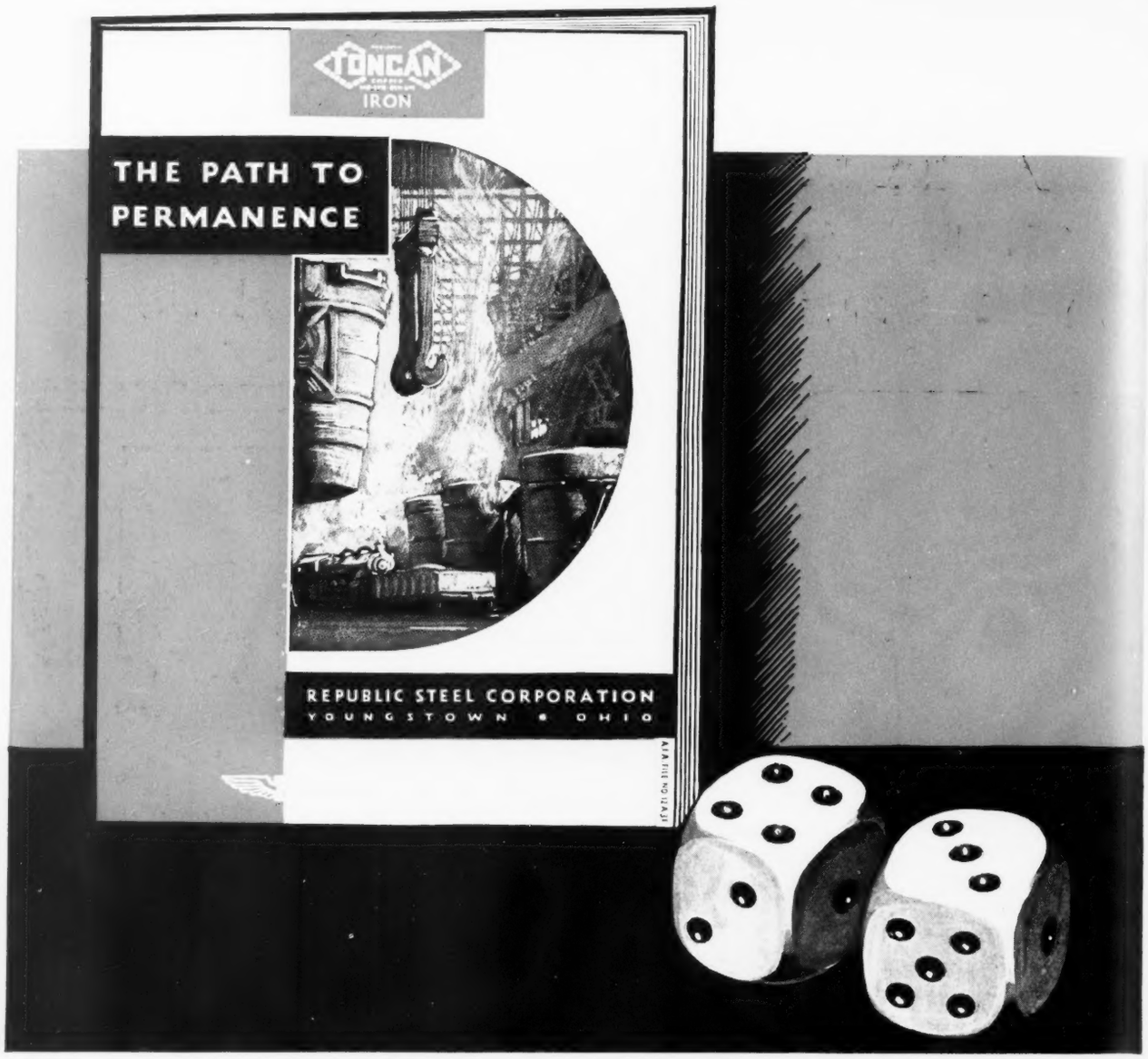
THE WARM AIR HEATING AND SHEET METAL JOURNAL

FOUNDED 1880



This gas-fired, filtered, forced air installation heats a home in Toledo, Ohio. The story of the installation is told in this issue

AUGUST 3, 1931



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Folke Clauson (right), President, Rockford Hardware Co., Rockford, Ill., and some of the Anaconda Copper ventilators his men fabricated and installed at Camp Grant, Ill. Copper supplied by Rockford Sheet Steel Co.

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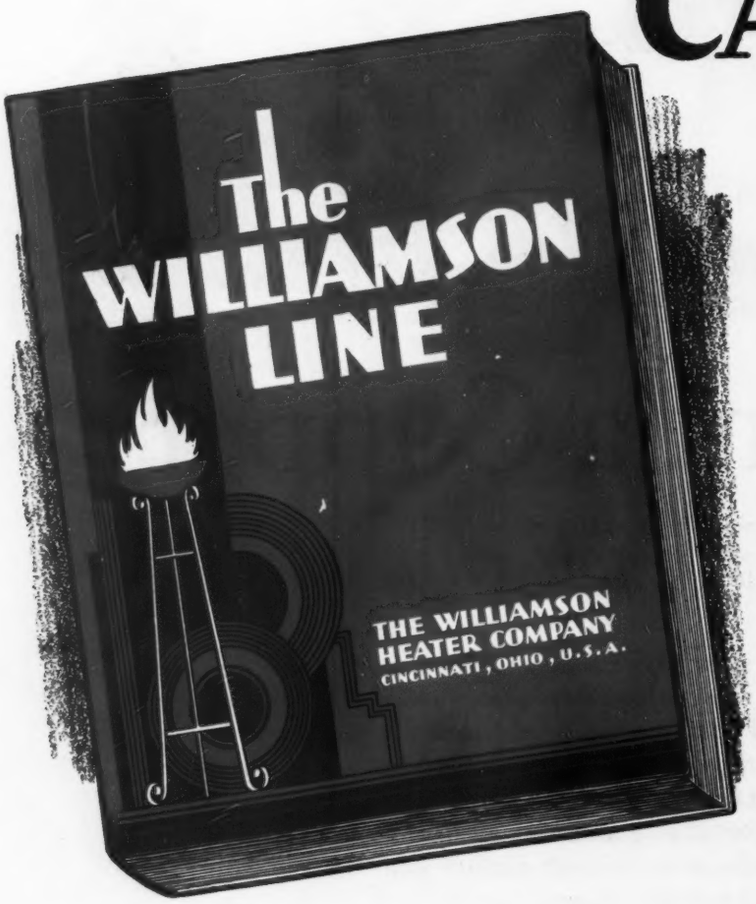

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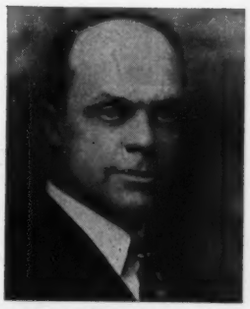

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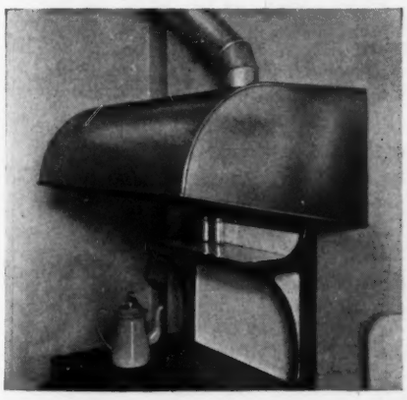
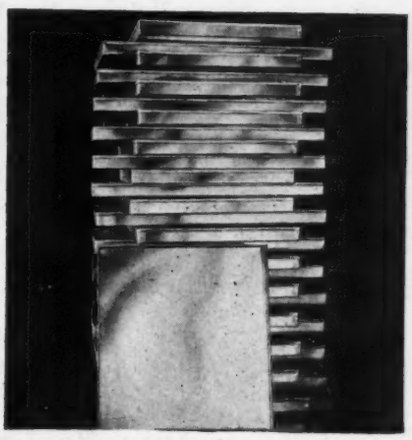
Rudman & Scofield attribute much of their success with Monel Metal equipment to the properties which distinguish Monel Metal from other materials. The fact that Monel Metal combines silvery beauty and a solid, chip-proof structure with rust-immunity, corrosion-resistance, easy cleanability and steel-like strengths . . . has helped this enterprising company land many worthwhile jobs and build a big clientele of large, repeat-order customers.



Monel Metal range hood fabricated by Rudman & Scofield for a New York apartment kitchen.

Rudman & Scofield made this Monel Metal cabinet top for a private residence.



Some of 200 Monel Metal dryer pans made for the Grasselli Chemical Company of Grasselli, N. J.

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THE WARM AIR HEATING AND SHEET METAL JOURNAL

Covering All Activities
IN
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

VOL. 100, NO. 16

AUGUST 3, 1931

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The Cleveland Stadium article in this issue is, we feel, worth reading by any sheet metal contractor who wants to know what is going on in the field of metal usage on large structures. There are numerous interesting details in the fabrication and erection of this unusual structure. It required real ingenuity on the part of the metal contractor to work out all the details.

* * *

There is a lot of discussion these days pro and con about furnace cleaning. Some contractors say it's a sure-fire way to get business. Others have gotten mired in a price-cutting war, with the result they are sour on the whole cleaning proposition. Walter P. Dennis has built his business from nothing to a nice, profitable income almost entirely from cleaning. We were interested in how he did it. It's told in this story. Probably you will be interested in it, too.

JOSEPH D. WILDER
Editor

Published Every Other Monday

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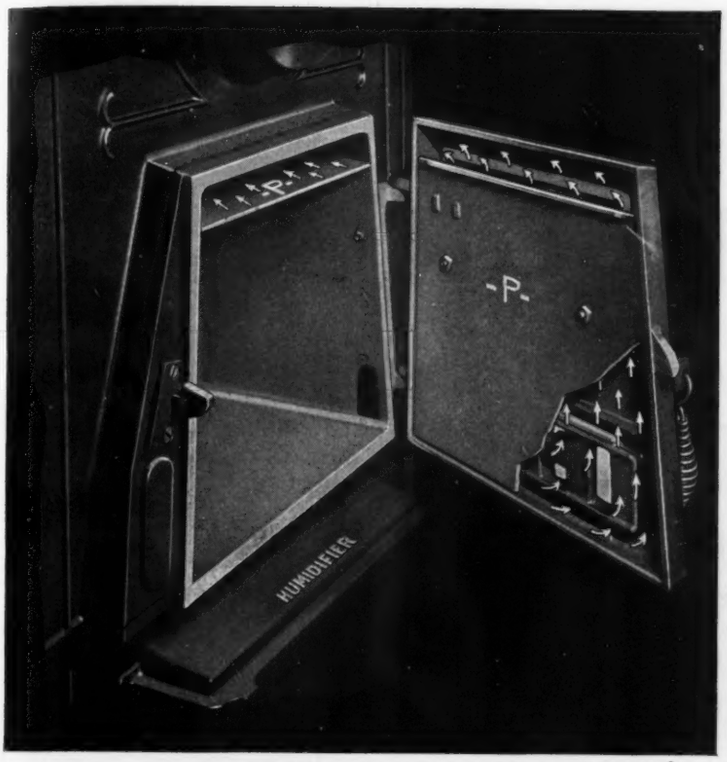

Air (oxygen) is taken in through the slide in the feed door. Passing up and back over two plates ("P"), it is pre-heated. It combines with the smoke and unburned gases. A secondary combustion takes place at the throat of the radiator above. The result is much additional heat.

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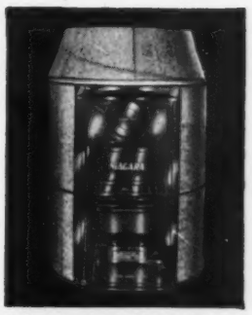

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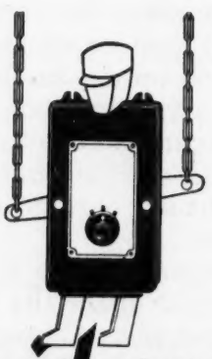

Your customers will thank you when they see the difference in their fuel bills. See your jobber today and get started with this fast selling line of better temperature controls.

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to ornament a building

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"It was our desire," they wrote, "to use metal in plastic forms . . . [*for the spandrels and the tower*] . . . in order to accent the vertical lines of the building and to add interest to the facade.

"On account of the beautiful color, the natural variation in tone, together with its permanence and workability, we adopted copper [*Revere*] without hesitation.

"The verde antique finish was developed by the use of acids, so that . . . the final color effect was established. The color tones, we believe, will improve with natural weathering."

Revere Sheet Copper is permanent, workable, economical . . . the weather-tried and time-proven metal for roofing, flashings, gutters, leaderheads and downspouts.

But Revere Sheet Copper is also and evidently more than just utilitarian. On large jobs or small, it is a material that does credit to the contractor who installs it.

For further information, address Revere Copper and Brass Incorporated, 230 Park Ave., New York City.

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Volume 100

American Artisan
THE WARM AIR HEATING AND SHEET METAL JOURNAL

Number 16

We'd Better Get Together

THERE is sore need in this warm air heating industry for uniformity in our scientific and engineering knowledge.

Hardly two authorities or contractors agree on the principles underlying the things we are now preaching and even basic principles are being twisted to prove personal contentions or half-baked ideas which have no foundation in fact and little foundation in theory.

This uniformity is badly needed right now and will be even more sorely needed before the end of the next two years. Perhaps it is natural in an industry as diversified as ours and in one containing so many schools of thought that authorities disagree, but something must be done about this and done soon or we are never going to get our facts so arranged that every contractor, regardless of where he operates or what equipment he uses, will be able to tell the same story.

And the time is here now when we must begin to tell the same story or someone else will step in and take our work away from us.

Here is the case in point. Not long ago a contractor wrote that he was having trouble with a cooling system where a blower and washer constituted the cooling element. The temperature was dropped all right, but the humidity was twice as high as it should be. The customer was disgusted. The contractor wrote asking what information we might have on the subject of humidity from washers. We gave him what we had and the information we gave was to the effect that the contractor never would be able to cool that house with a washer. The job had been sold under the manufacturer's claims, which were not true.

Subsequently a letter sent to several contractors and engineers brought out the fact that hardly any two were using the same established facts in submitting their answers to our problem.

Now in such a typical instance, something is radically wrong when authorities fail to agree on basic principles.

And we must not lose sight of the fact that as air conditioning becomes more complicated an even greater need for basic facts will be required.

Carrying this thought farther, how varied indeed and how terribly wrong also, must be the general run of information and opinion on subjects which every heating man should be able to discuss forward and backward?

And how can an industry expect to give the public any confidence in its ability or its products if every contractor presents different ways of doing the same thing and different reasons why he does as he does?

Right now the warm air heating industry is straddling the doorway between "hot air" heating and "air conditioning." The first term was not rightly descriptive of how we heated in years gone by and "air conditioning" is not truly descriptive of the general run of forced air work being done today. A furnace with a fan and some filters attached cannot truly be termed an air conditioning system.

However, be that as it may, the fact cannot be denied that the public is beginning to ask questions about this new type heating and as usual is expecting to get some uniformity in the answers. If the public doesn't get this looked-for uniformity then it will decide that those who should know don't and because they don't there must be something sadly wrong with the thing we are trying to sell.

That certainly is the last thing we can let happen. Losing the battle after a good fight is bad enough, but losing the battle because we ourselves couldn't get together on our problems is admitting defeat before the first shot is fired.

What can be done? Surely the problem is big enough to need and use the services of every agency, every person making a living from warm air heating, especially this new type heating we are talking about. Perhaps the solution should be left on the doorstep of our national heating association. But that association, like many others these last two years, has been hit by the depression. Perhaps our engineering schools should release their findings in usable form. Perhaps the solution must lie with the trade papers to make available every possible bit of information and invite and solicit discussion on our problems.

Something must be done—what do you think?

This Toledo Installation Has Everything Fully Modern

"THE trend is to warm air!" How frequently you hear this well-worn, but pertinent, conviction emphasized when heating engineers and contractors talk "shop." This modern, conditioned warm air—automatic and completely controlled—hasn't much in common with our old friend "hot air." Engineering, research, and development have entered into the picture. "Air conditioning" has become a charmed expression. Manufacturers of warm air equipment have been on their toes and the public has been listening. The heating engineer and contractor has come into his own.

Another thing—architects have become interested—and builders. They formerly considered "hot air" for mass production—where it was necessary to have a furnace in the basement to be "fully modern," but they had a weather eye on the cost. So "hot air" filled the bill. Now it's different. Many are accepting —using—and recommending warm air, not on a cost basis, but for reasons ultimately much more permanent—health, convenience, comfort, cleanliness. The heating engineer and contractor are doing the same thing. The public is responding

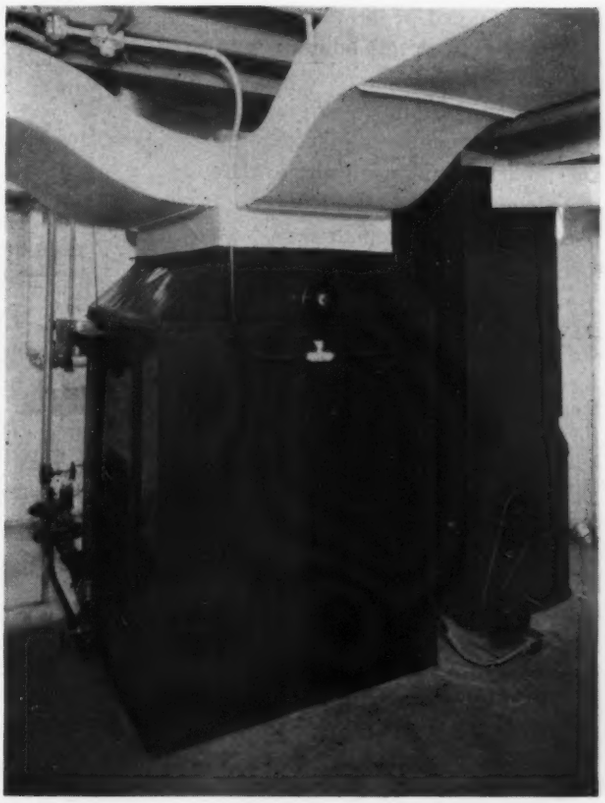
Registers throughout the house are placed in advantageous locations, but are out of the way of furniture. This register is in the living room. The face is painted to match the woodwork

rapidly to this infiltration of the idea—and it's going over.

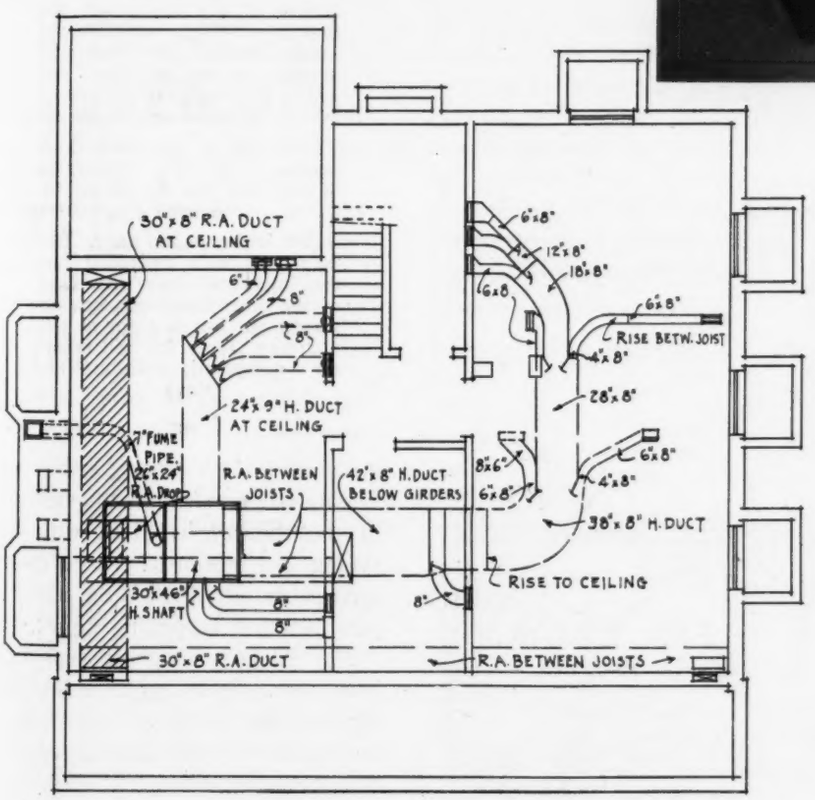
Heating and ventilating engineers, especially those specializing in the better class of domestic business, are making the best of opportunity. They are applying scientific methods for rule and thumb inaccuracies of the past. They are talking warm air heating and air conditioning with a gusto that echoes the convictions of science.

One such man is W. H. Sloan, heating and ventilating engineer of Toledo, who has established himself as a specialized engineer in automatic conditioned heat. Some of Mr. Sloan's earlier jobs have been reported previously, but one which he has just turned over to the owner is worth describing. It represents a typically modern, automatic warm air plant — installed with the patient correctness that makes it a thing of beauty and care-free service.

At the right is shown the heater with the filters and the blower behind. Note how space has been conserved by making the filter housing a continuous part of the blower



Below is the lay-out of the piping system. Two trunks and two small ducts are used. Return air is through two ducts. All duct work is up against the joists



The home is located at Perrysburg, Ohio, fashionable suburb of Toledo. It is of severe, but beautiful, Cape Cod architecture, designed by Mills, Rhines, Bellman and Nordhoff, nationally known residential architects of Toledo. The construction costs are estimated to be around $30,000. Genuine antique furniture harmonizes tastefully within. It's really an ideal setting for modern warm air. And Mr. Sloan has contributed not a little to its comfort and utility.

The heating plant is located in a small basement furnace room—a striking example of compactness and clean cut workmanship. It is a Columbus 915 Gas Fired Furnace, manufactured by the Surface Combustion Corporation, Toledo, Ohio, fired with 1050 B.t.u. natural gas. The B.t.u. output per hour is 167,348; input, 196,880. The fan equipment consists of a Furblo Blower unit. Four filters, located directly above the blower, pass 3000 cubic feet of air per minute at ¼-inch pressure. The blower is automatically controlled. Warm air is by-passed to give continuous heat in cold weather. Register temperature is held to 125 degrees. Humidity is automatically maintained just below the condensation point for single windows.

All warm air runs are placed as direct as possible—scientifically run to give maximum heat distribution with constancy of temperature. All trunkwork is double seamed and not Pittsburgh locked, an unusual feature.

Mr. Sloan was very careful in laying out the job to place all grilles inconspicuously. The living room warm air register is located directly under the front window casing—

as will be noted in the photograph. Return airs were all built in with the mill work.

Provision was made to give full play to the circulating system by an abundance of return air, so that the blower system would be effective for summer circulation.

The following outlet data will be of interest:

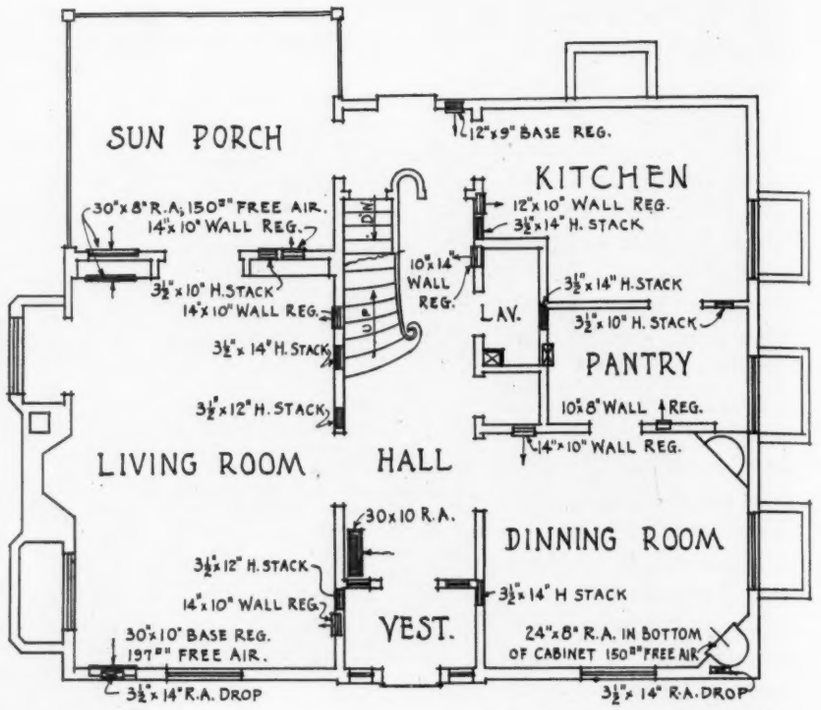
	—Air Vents—	
	Warm	Return
Living room	2	4
Sun room	1	1
First floor hall	2	2
Dining room	1	1
Kitchen	1	none
Butler's pantry	1	none
Master's bedroom	2	2
Master's bath	1	none
Second floor hall	1	none
Guest bedroom No. 1	1	1
Guest bedroom No. 2	1	none
Guest bath	1	none
Maid's bedroom	1	none
Maid's bath	1	none

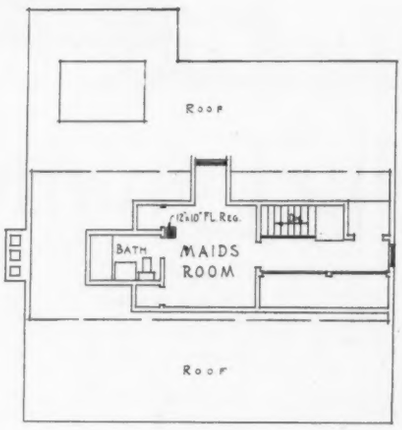
Ducts were all formed from 22, 24 and 26-gage steel, uninsulated. The smoke pipe is painted with ordinary paint.

The cost of the complete installation was approximately $1400, a modest figure considering the type of job it is. This is slightly in excess of the cost of a gas heated, hot water system.

The estimated fuel cost for this installation for a heating season of 8 months, prevalent in this section of the country, is $115, with an average gas rate of 62 cents a thousand cubic feet, 1050 B.t.u. natural gas. Another surprising figure.

Mr. Sloan's progress has not been easy. Operating as a heating engineer and not a furnace dealer, he has had to build his progress on direct contact selling. "I find," he says, "that one man tells another and one woman another, too. Selling conditioned air against competing systems has not been easy, but advancement is coming rapidly. Owners are talking conditioned air and architects are specifying it. Natural gas has helped, but a demand for better, more healthful home heating is doing more than all else to build a market for us."

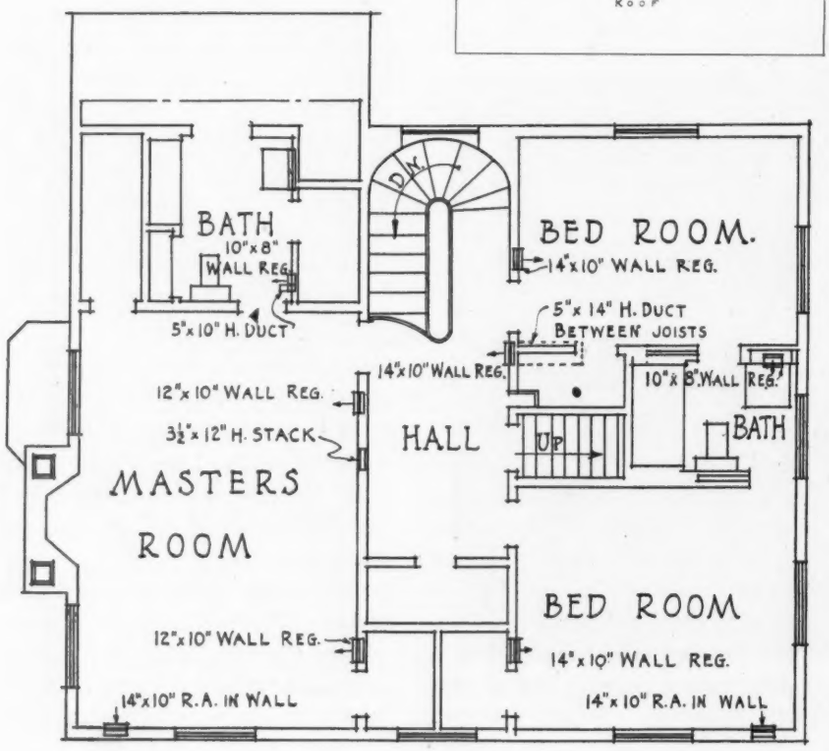


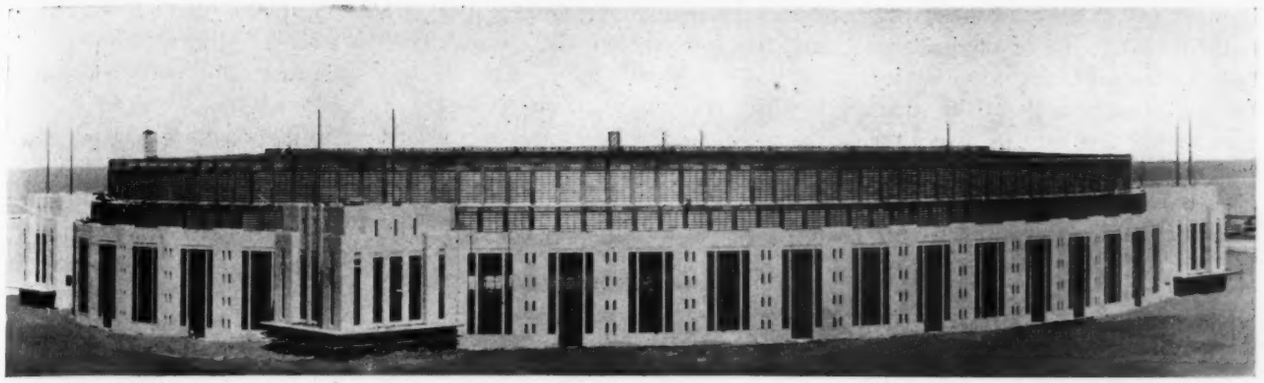


Above is the layout of the first floor. Warm air from the inside, cooled air from the outside, is the practice. All grilles and registers are placed in out of the way locations

To the left is the third floor maid's room. The register is in the floor and no return air is used

Below is the second floor. The large master's bedroom has two inlets and one return. One of the other bedrooms has no return air, but is right at the stairway. Only the hall register required any additional fittings





Cleveland Stadium—1931's Largest Aluminum Sheathed Structure

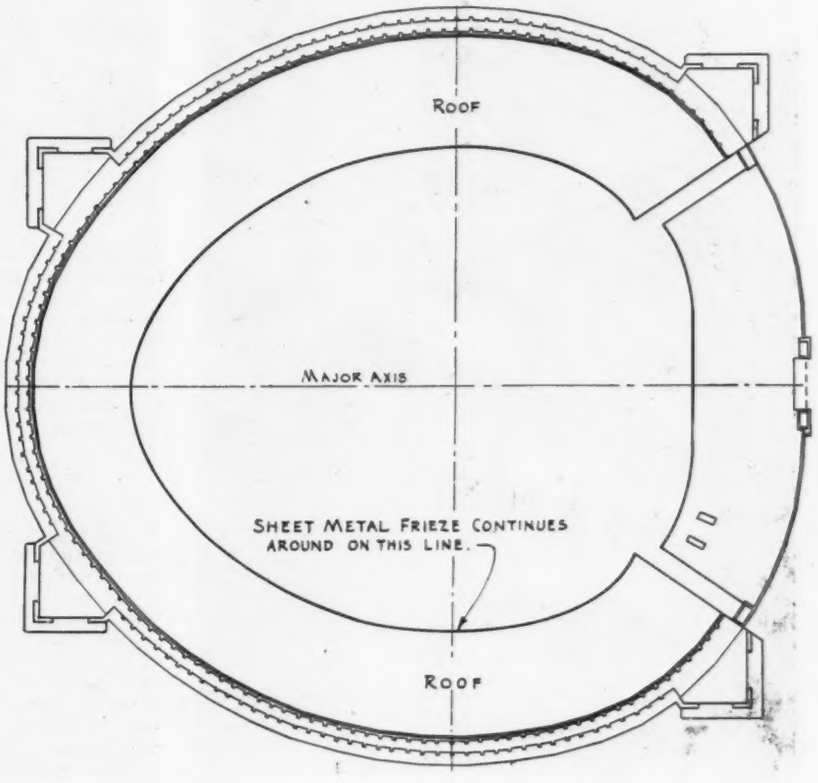
ON the evening of July third, 36,000 or more fight fans gathered in Cleveland's new municipal stadium to witness the heavyweight battle between Champion Schmeling and Challenger Stribling. No doubt millions of other fans listened to the radio broadcast of this event. The bout was the first event staged in the new stadium which has been six years in the planning and construction.

While plans for the stadium were first considered six years ago, actual construction did not start until June, 1930. The huge structure is one of the finest and largest stadia in the country. While in general plan it follows the design of other similar structures, many new and interesting features were incorporated in its construction.

The stadium stands on the lake front between the railroad tracks and the lake. Entrance is by way of special bridges over the tracks leading from the center of the lake front plaza. The stadium occupies a ground area of 800 feet from east to west and 710 feet from north to south. In its cross section, the front rows of the main deck are concrete laid on the ground. The rear portion of the main deck is supported on structural steel. The upper deck is concrete on steel with a roof cantilevered out some 8 feet beyond the line of the upper deck.

Space is provided for more than 78,000 permanent seats, but for such events as football games and prize fights 110,000 persons can be accommodated. A permanent baseball field with foul lines 320 feet long and bleachers 450 feet from home plate and a football field are already established.

Of the many new features of the



The stadium is a gigantic, egg-shaped structure enclosing a baseball diamond or a football field. Concrete and steel make the frame, with aluminum sheeting providing the exterior facing

stadium, one of the most interesting is the extensive use of sheet aluminum as the surfacing material for the entire upper walls of the structure. Metal was used to reduce the weight of the exterior walls and also because one of the guiding ideas of the designers was to erect a structure which would require a minimum of maintenance and upkeep expense and service.

In the exterior walls, the end panels, the frieze, and the marquises which protect the four main entrances more than 130,000 pounds of sheet aluminum were used. This makes the stadium the largest single user of aluminum yet built. The material is a special alloy known as 4-S-4 aluminum. The material is stiffer than the usual material of the same gauge. The stiffer material was desirable as a protection against wind pressures. Just a short time ago a 60-mile gale tested both material and construction. Not a rivet or bolt was loosened.

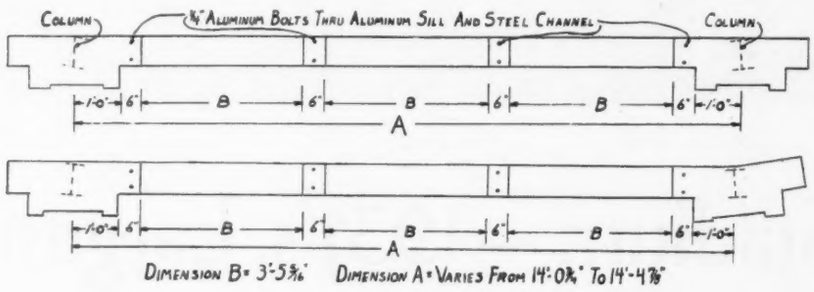
The contractor who fabricated and erected this large amount of sheet metal is the Riester and Thesmacher Company of Cleveland.

The Riester and Thesmacher Company also furnished and erected the hollow metal Kalamein and tin clad doors, and erected the rolling curtains. In addition, they erected the huge 30 by 60-foot scoreboard and the ticket boxes.

The shop and field work and the planning required to fabricate and erect this huge metal project entailed some new and interesting problems in sheet metal craftsmanship. The shop work alone required elaborate planning in order to put through on schedule the thousands of units required for the louvred exterior sections, for the two huge enclosing ends of the grandstand, and the hundreds of feet of frieze.

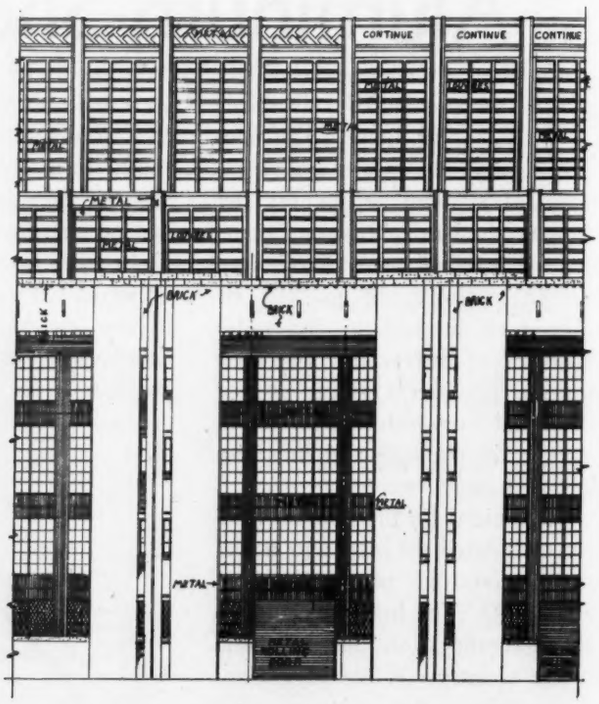
In order that this part of the work might progress smoothly and on time, special forming dies were made by the contractor. The units were formed on the power presses which constitute part of the shop equipment of this firm which is also a manufacturer of interlocking steel stairs, hollow metal doors and special steel equipment.

An interesting feature relates to



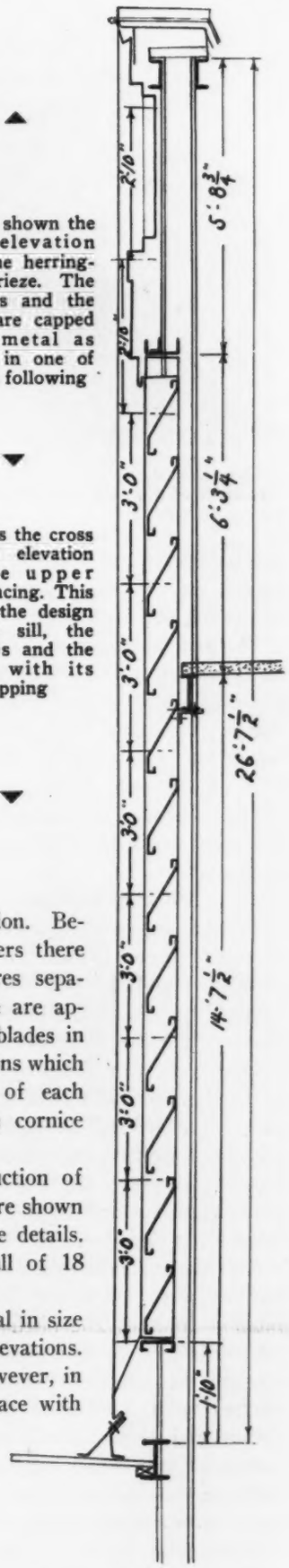
Above is shown typical pilaster, mullion and louvre section. The curve of the exterior is taken care of by pitching one of the pilasters in a bay as shown in the lower right corner of the drawing

At left is shown one of the metal sections being raised into place. The open space above the louvres holds the frieze. Notice how the sections were delivered to the job assembled between pilasters



Above is the exterior of the stadium. The lower elevation is faced with brick. Above this are the two set-back metal-sheathed elevations

Left is shown the upper elevation with the herringbone frieze. The pilasters and the frieze are capped with metal as shown in one of details following



Right is the cross section elevation of the upper metal facing. This shows the design of the sill, the louvres and the frieze with its capping

the protection of the aluminum. As the aluminum is applied directly to the structural steel, the steel was painted with two coats of aluminum bronze paint to eliminate chemical action.

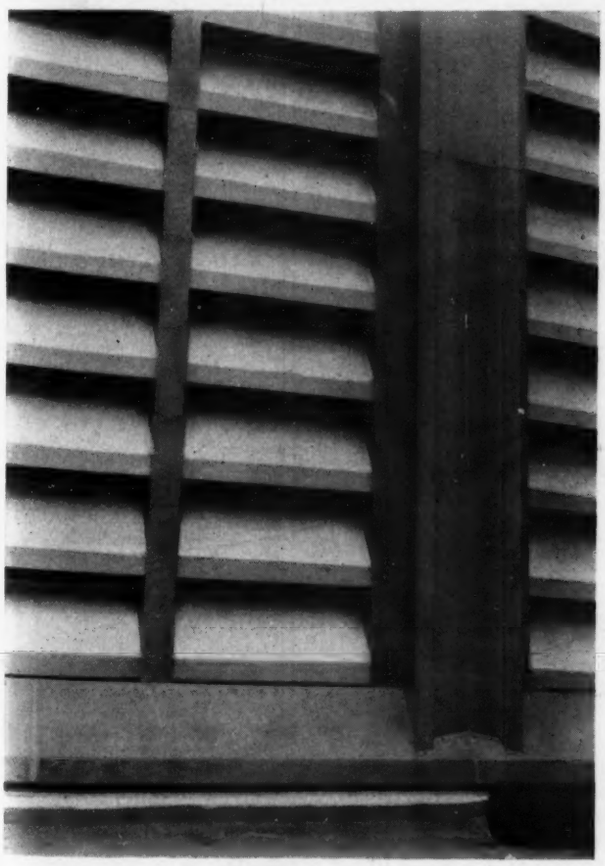
The Walls

In general design the exterior walls of the egg shaped structure consist of a first elevation of brick equivalent to four stories at the center or a height of 86 feet. At this level there is a setback and above this the aluminum surfacing begins. The metal consists of two elevations, the top elevation being set behind the lower one.

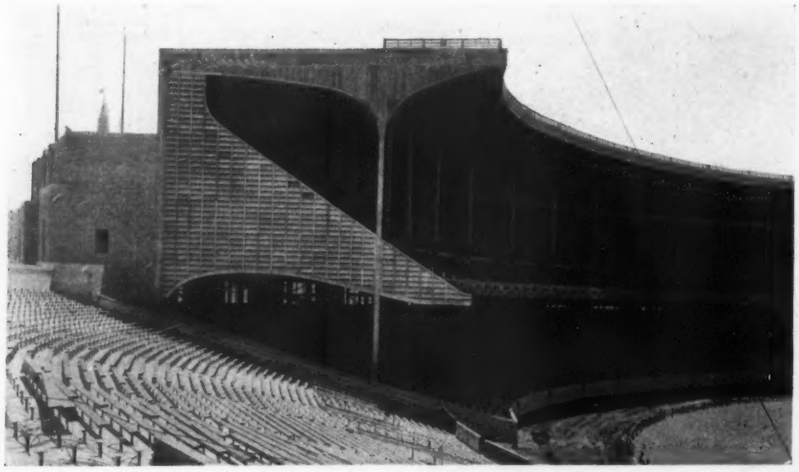
The lower elevation is 13 feet high. The wall is composed of a continuous series of aluminum pilasters 14 feet center to center and running from the lower roof to the top of this metal elevation. Between each pair of pilasters there are three panels of louvres separated by mullions. There are approximately 7,000 louvre blades in 700 sections between mullions which are 20 gauge. The top of each bay has a flat aluminum cornice and frieze.

The design and construction of these pilasters and panels are shown in the photographs and the details. There are 235 pilasters all of 18 gauge material.

The pilasters are identical in size for both lower and top elevations. Some variation occurs, however, in the pitch of the pilaster face with the line of the inside panels, since the round contour of the exterior is taken up entirely by pitching one pilaster and not by rounding the



At the left is a close-up of the louvres at the level of the sill. Note how the pilasters are bolted to the sill and how the excellent craftsmanship makes the joints practically invisible. All of the metal excepting the sills is crimped



The ends of the grandstand are sheathed in metal. The triangular section consists of mullions and louvres. The top is designed as a frieze with sunken panels below

panels between the pilasters. These panels are, in all bays, straight across the horizontal face.

The general design of all the pilasters is identical. The face is composed of a wide flute, between two narrow, flat faces. The projection behind this face varies to meet the turn of the wall. The center line of each pilaster corresponds with the center line of the structural steel columns.

Pilaster Design

In fabricating these pilasters, one sheet was formed to make the fluted front face and the two side faces back to the offset panel holding the louvres. The three sections of each pilaster were then joined by turned in double locks and riveted at intervals for additional strength. The pilasters were formed in convenient lengths using two sections for the lower elevation and three sections for the top elevation.

One of the details shows how the louvres were assembled in their mullion frames. The pitch of the louvres is such that you cannot look straight through the louvres. The louvres were formed on the machines and then riveted to their panels. Each louvre section consisted of the two side members and the louvres and was so delivered to the job.

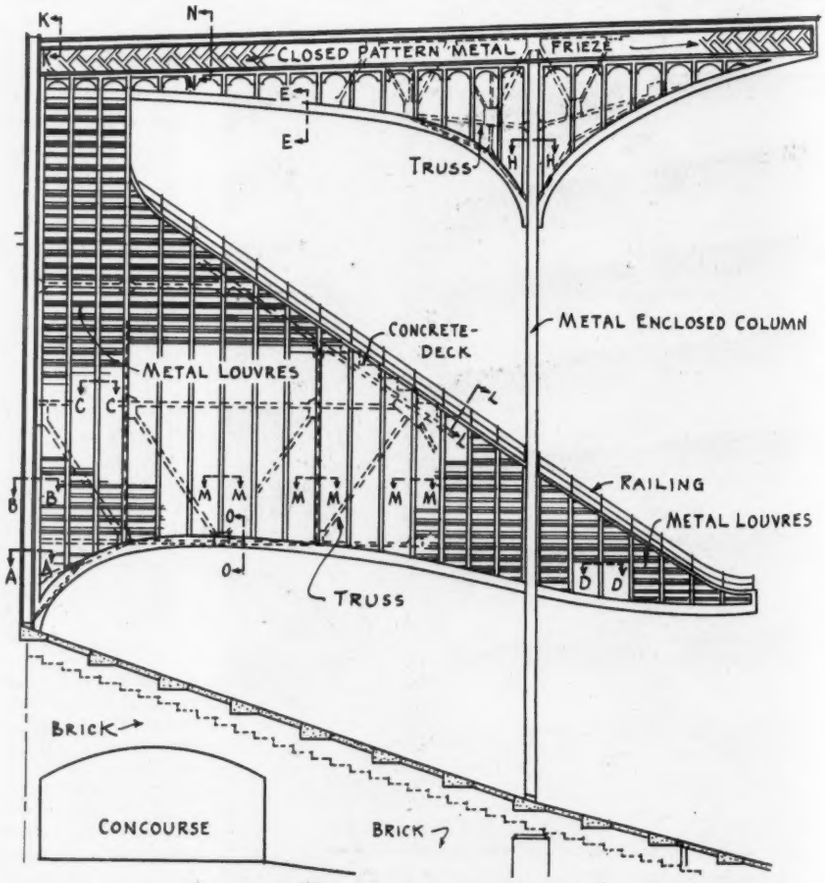
Erection of the panels consisted of putting a section in place and bolting it to the steel frame. A mullion cap, similar to the cap of a batten roof, was then locked over standing edges. The combined frieze and cornice was fabricated as a separate section. One of the photographs shows a bay in process of covering. This shows how the louvre panels were delivered at the job and erected. The framing for the frieze is also shown, along with a good view of the pilaster construction.

All of the aluminum used for the pilasters and mullions and louvres is crimped sheeting. The pilasters were bolted to the special 12 gauge aluminum sill which covers the roof flashing. This is also shown in one of the photographs. The sections of this sill were welded together for tightness. The flashing under this sill is also aluminum.

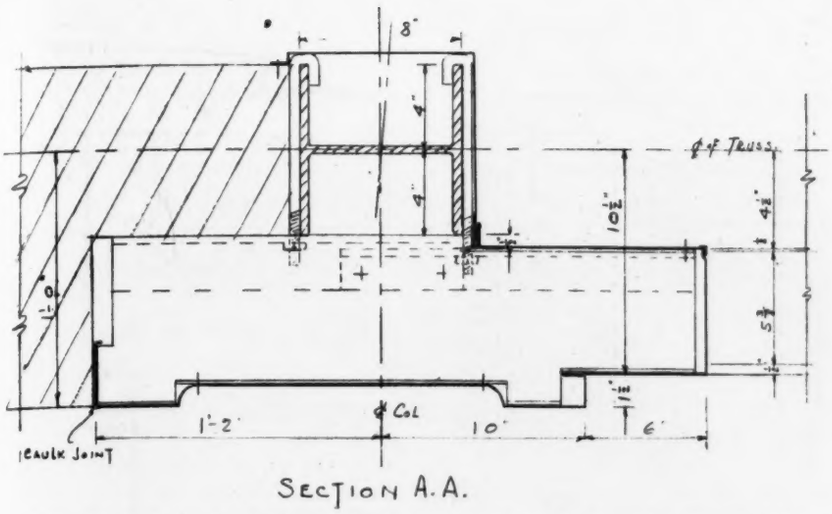
The design and construction of the aluminum on the upper elevation is identical with that of the lower course, excepting that the frieze which tops off this wall is ornamented by a herringbone enrichment of simple, but effective design. Entire sections of this frieze were cut, formed and welded together in the shop and delivered ready for erection. This upper course is about 26 feet high, and uses more sections of paneling than the lower elevation. The design of the panels is identical.

Full details of the design and fabrication are shown by the sketches.

The next most interesting feature of the metal contract and in some

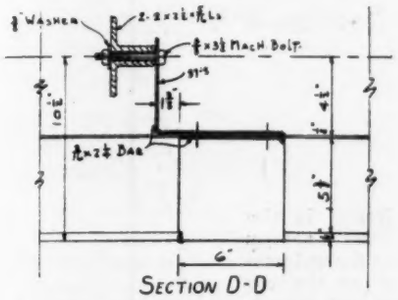


This detail shows how the metal is applied and also indicates where the various details which follow are located



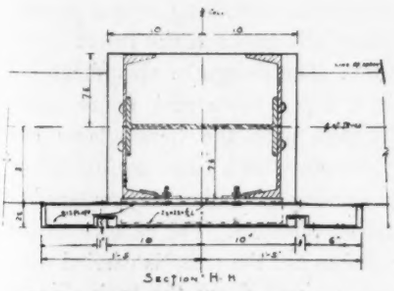
This detail shows how the metal encloses one of the large end columns. The steel bracket is secured by two anchor bolts

points, particularly with regard to the amount of nice layout work required, even more interesting than the louvres, is the huge metal covered ends of the grandstand. The amount of metal used here does not compare with that of the walls, but

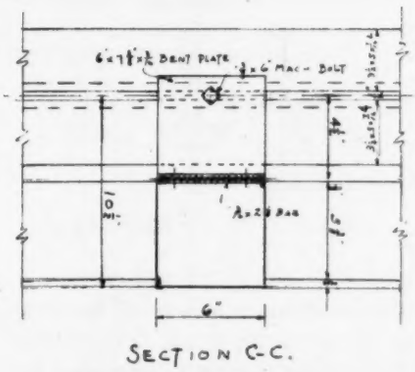


Section D-D is another interesting mullion out toward the end of the cantilever. Note again the means of support to the steel

on the ends much detailed planning was required in order to devise ways to fasten the metal to the open trusses and enclose the columns and other structural members.

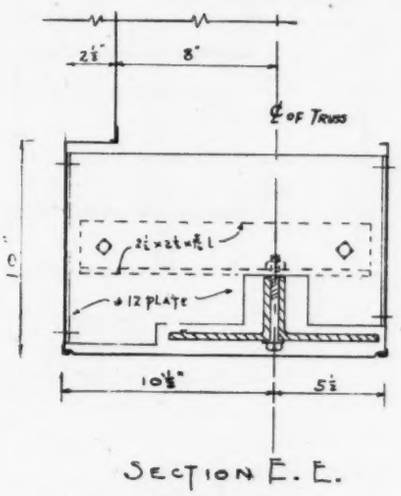


Section H-H is a column enclosure at the top of the column. In this location, metal is carried completely around the steel and is supported in brackets



This section shows the formation of a mullion. The mullion is a complete metal box. Note how the aluminum is held to the steel

Roughly the work here consists of a metal covering for the roof truss which projects out over the stands and a louvre covering for the end of the two decks. Probably



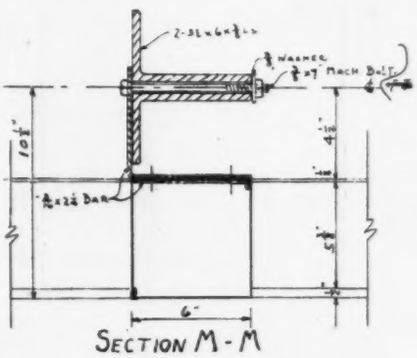
Section E-E is the lower chord of the top metal work. The two angles are the lower chord of the steel truss

the most difficult feature of this part of the contract was devising ways and means of hanging the metal on the steel.

Perhaps this is more easily explained by drawings than by words. If so, details are shown of as many as possible of the interesting points requiring special handling. One of the drawings shows a view of the end with the points detailed indicated by cross section arrows.

Column Enclosures

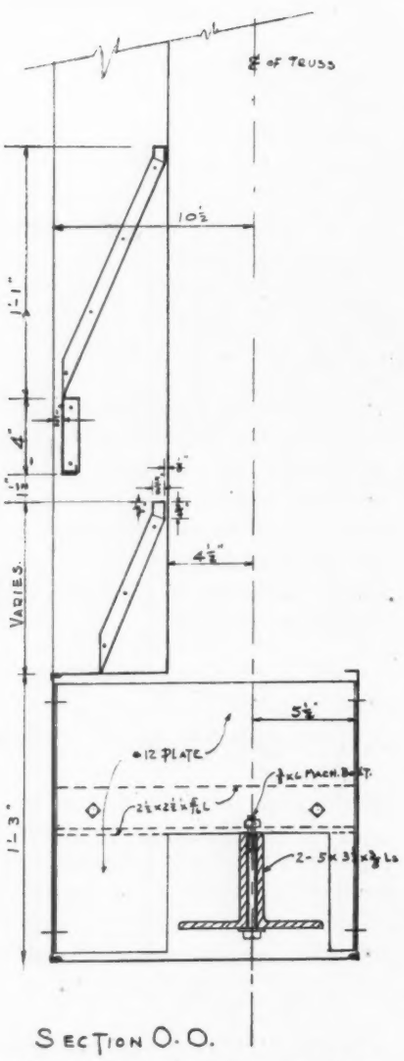
In this part of the work, two structural features had to be accommodated. These are the column enclosures and the method of hanging the louvre mullions on the trusses. Briefly explained, the mullions were suspended from bars and plates



Section M-M is a typical mullion where the steel work lines up closely with the mullions of the aluminum

which were held by an angle which in turn was fastened to the truss by passing a bolt between the two angle sections of the stiffening members of the truss. This is shown in the details. On all these mullions, Pittsburgh locks were used on the metal. The various methods were necessitated because no uniform steel work lies behind the metal.

The aluminum column enclosures were held to the steel in much the same way. On the columns a steel plate cut to the rough shape of the metal faces was clipped or bolted to the flanges of the columns. The aluminum was then locked around these plates as shown in the details and carried around the column faces as needed. On the columns which form the fulcrum of the

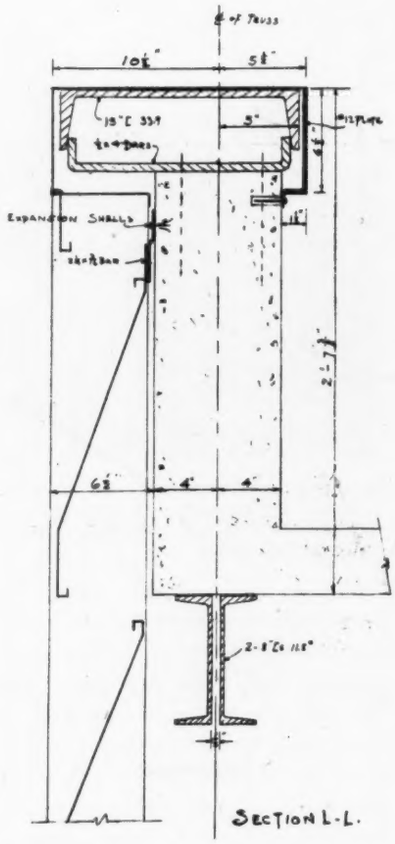


This shows how the lower chord of the truss is enclosed and how the louvre section above is joined to the boxed section around the truss

cantilever the metal enclosed the steel completely. One of the details shows how this was done.

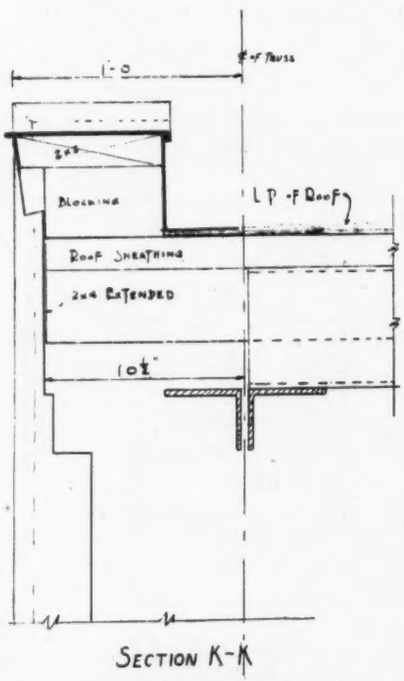
All the louvres are of the same size—3 feet 3¼ inches wide and 5 and ⅜ inches from front to back. The louvres are riveted to the mullions.

On the louvre panel the bottom chord of the truss which supports the upper deck and the cornice just above the top chord required special treatment. The bottom chord is enclosed in a box member shown in one of the details. The support here very similar to the column enclosures, being a three-sided metal box with Pittsburgh corner locks supported on a steel plate which is bolted to the structural frame. The top cornice is more than 2 feet

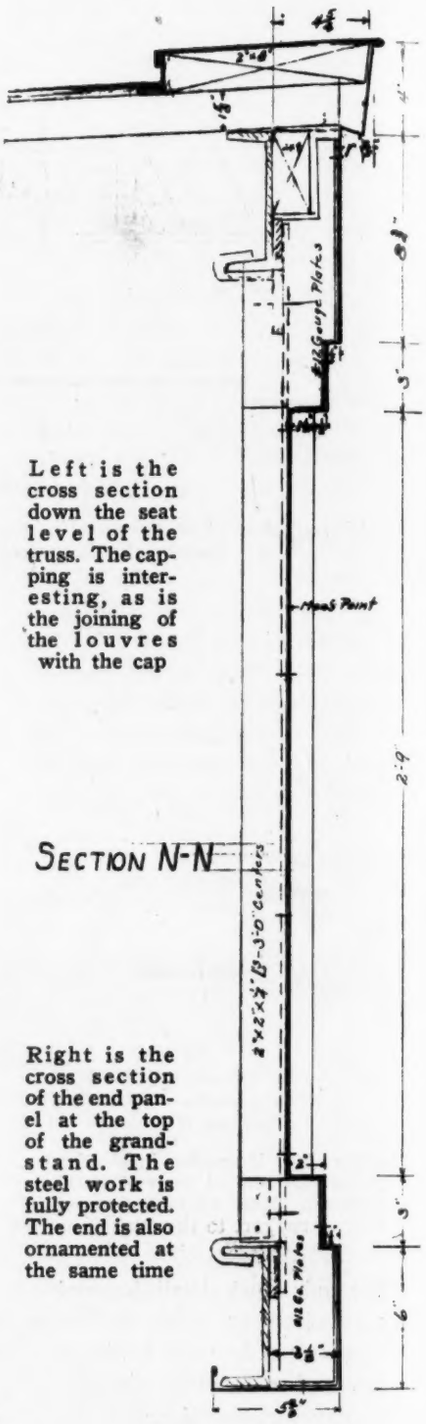


above the top chord and encloses a double channel structural member as shown in the detail. The outside face of the cornice is supported by the louvre section while the back side is held by screws in sleepers.

The roof truss is enclosed in an



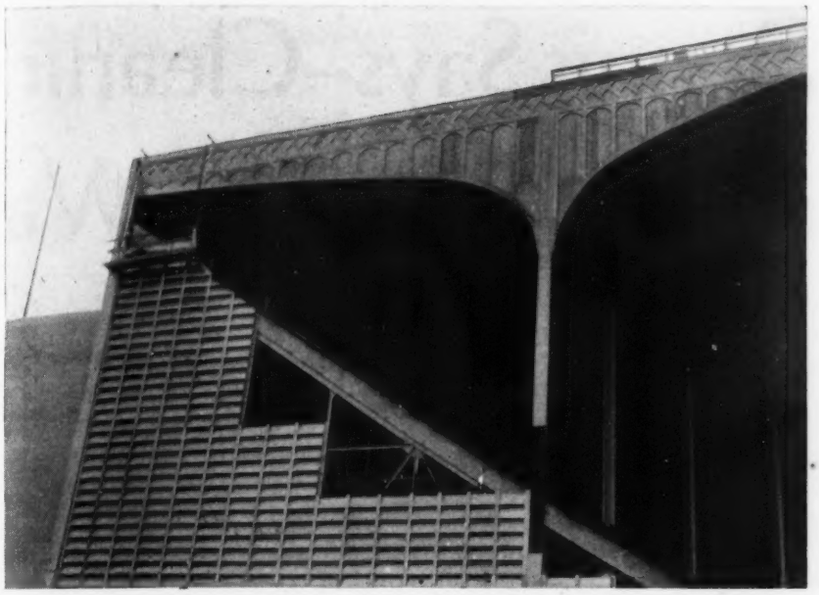
This cross section shows the method used to protect the aluminum frieze from moisture penetration by an aluminum cornice cap



Left is the cross section down the seat level of the truss. The capping is interesting, as is the joining of the louvres with the cap

Right is the cross section of the end panel at the top of the grandstand. The steel work is fully protected. The end is also ornamented at the same time

aluminum sheathing which swings gracefully down at the fulcrum column. The design of this sheathing is a top cornice and frieze ornamented with the herringbone enrichment with a panel section below consisting of sunken flat centers between pilasters. The cornice which finishes out the truss is carried over the top and down the back side to flash the roof. The metal here is supported on wood blocking laid on extended roof sheathing.



This photograph shows the metal work on the grandstand and how it was applied. The ornamentation at the top is simple, yet effective and ornate

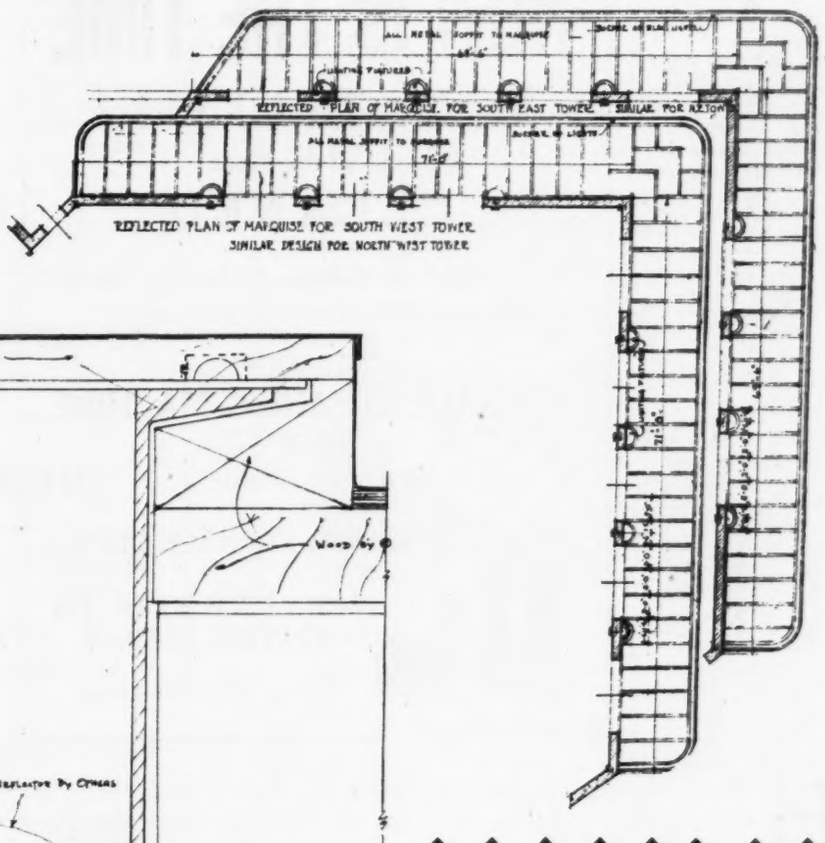
The Marquises

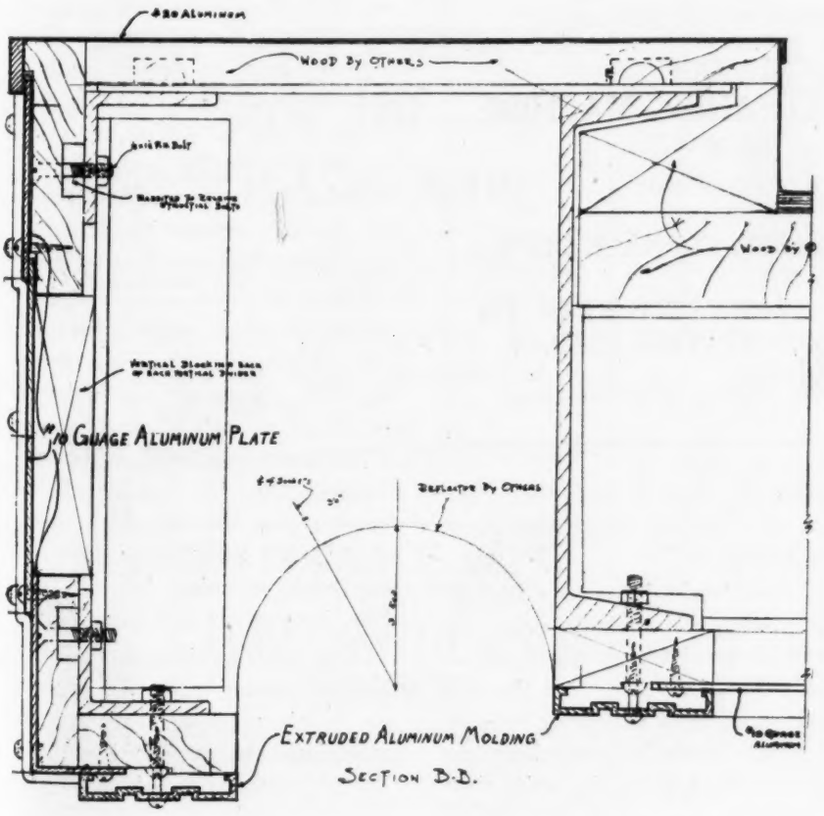
Another metal feature worthy of comment are the four aluminum marquises which protect the four entrance doors. These marquises have two sides, each side being 74 feet 6 inches outside to outside. The structural steel is covered with wood sheathing and wood backup to support the metal. The under edge of each marquise carries a row of reflecting lights set in wells. The top of the cornice consists of an aluminum sheet locked to flashing at the back and carried down and behind the 10 gauge aluminum plate which forms the face of the marquise. One of the details shows this construction and also a cross section of the face. The under side is composed of 10 gauge aluminum plates ornamented by extruded aluminum mouldings held to the backup by wood screws. The erection of this plate work was a part of the Riester and Thesmacher contract. Aluminum nails, screws, bolts and rivets were used throughout.

The Frieze

Around the entire inside roof edge of the horseshoe the herringbone frieze used on the outside walls is used to finish off and ornament the roof. The sections of

(Continued on page 35)


REFLECTED PLAN OF MARQUISE FOR SOUTH EAST TOWER SIMILAR FOR NE TOWER
REFLECTED PLAN OF MARQUISE FOR SOUTH WEST TOWER
SIMILAR DESIGN FOR NORTH WEST TOWER



Above is the under side of two marquises. This is formed of plate aluminum and extruded shapes. A description is in the text. At the left is a cross section of the edge of the marquise showing the light wells, the extruded members and the method of fastening the metal to the backup

Dennis Says—Cleaning Is a Sure-Fire Way

He disclaims any halo of super-salesman, super-business man or super-anything else. He counts his cleaning orders—so many to the mile and canvasses and advertises to owners in that mile to get his cleaning business. In one year—1930—he cleaned 203 furnaces, sold 40 new furnaces and made 64 resets—all from cleaning solicitation.

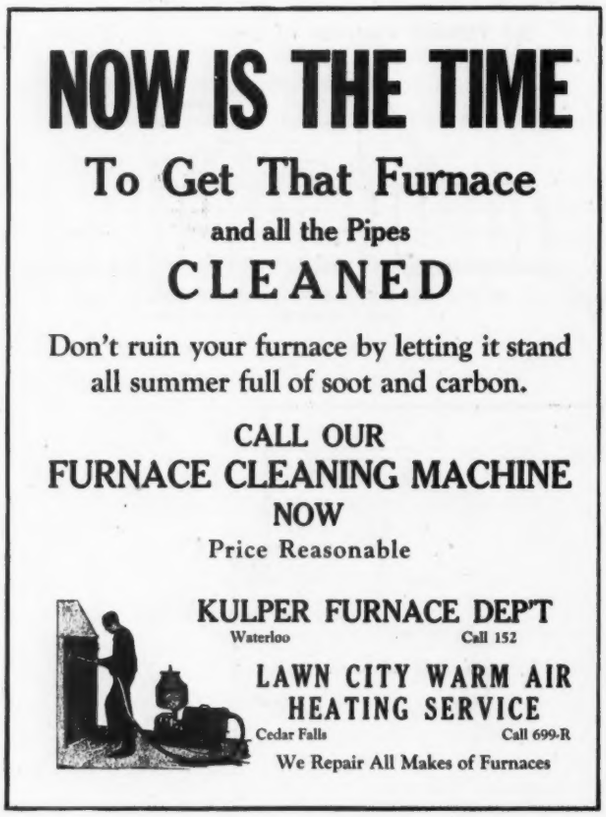
▲

Above is the telephone book advertisement Dennis runs. He says it doesn't bring in cleaning business—and it shouldn't for it does not talk about cleaning. It hasn't proved a good business getter.

▲

Right is one of the mailing stuffers soliciting cleaning. This one is black ink on red paper. The cost is low, but the stuffer brought orders.

▼



HOW to get repair, replacement, contract—any kind of work—in these months of slow business is a problem that every heating contractor lays awake nights thinking about.

Much as it hurts to admit it, too many contractors stop right there—thinking about it. Their bright ideas and aggressive plans come to naught, simply because they can't get up the steam to put these plans in operation.

Some bright business man said not long ago—"there's only one way to get business these days—make so many calls a day that the law of averages will bring in some orders. Naturally some lines require more calls to the order than others, but in every business there is a limit beyond which the salesman cannot go without getting an order, even if he doesn't want it."

If you need proof that this rule holds good even in the heating business, Walter P. Dennis of Waterloo, Iowa, has dragged business into his office despite depression, tight money and all the other dozen or so local bug-a-boos.

Walter P. Dennis disclaims any halo as a super-salesman, super-business man, or super anything else. He does admit that he likes to work and is willing to do so just as long as his feet hold out. And that reference to feet is not in fun, for the business he has gotten can be literally counted as so many orders to the mile.

This contractor has built his business on cleaning. Furnace cleaning with a vacuum. He does not operate in a town where everyone is anxious to have their furnace cleaned. They have to be sold on the idea, just like they do in every other town. But Dennis does not stop with planning how to sell them, he gets out and canvasses.

Here is what he accomplished through cleaning canvassing in 1930—a tough year in Waterloo. A gross business, produced entirely through cleaning, of $8,000. All

To Get That First-Time Job

good, clean business. He handled 260 complaints of owners whose furnace didn't work right. And these complaints were unearthed through contact soliciting a cleaning job. He cleaned 203 furnaces all at a flat price of $5.00 per furnace. He sold 40 new furnaces, all discovered through this cleaning canvass. He reset 64 furnaces, again from cleaning.

For a not-so-big town, that is quite a busines from one idea.

Getting this business was the big problem. Doing a cleaning job after contact was made, resetting furnace when the cleaning disclosed that new cement was necessary, even selling 40 new furnaces to replace heaters which were worn out wasn't as big a job as the problem of getting into the owner's basement and doing some job which established Dennis as a heating man in that customer's mind.

Three methods of getting contact were used. First an advertisement telling about the Dennis heating service was run in the classified telephone directory. That ad, which is illustrated, hardly paid for itself. Citizens didn't seem to be anxious in these times to even think about buying a new furnace.

Direct mail of several kinds was tried with varying results. Low cost stuffers, of the handbill type, were used. The appeal of these was for cleaning orders. Three of these handbills are shown. They did a fair job. The stuffers were mailed to home owners and not distributed by hand.

In addition to the stuffers, cards like the ones shown were mailed. These cards did not pull during the winter for only 2 per cent of the cards came back. However, some

▲

This is another stuffer, this one also black lettering on red paper. This stuffer required more reading, but sold a goodly number of cleaning orders in the spring when orders are hard to get.

▼

Clean Your Furnace Now for Spring Cleaning
We have a Special Price
We clean Warm Air Pipes Cold Air Pipes, Chimney and Furnace.
Make your Appointment Now for our Machine.
KUI PERS FURNACE DEPT.
PHONE 152 - - WATERLOO, IOWA
OR
LAWN CITY HEATING SERVICE
PHONE 340
CEDAR FALLS, - - IOWA

DON'T READ THIS
If You Have Taken Care of Your Furnace this Summer for the Coming Winter.
Most people have their fur coats cleaned and put away and others buy new ones early in the summer. By doing so they save money.
What have you done to take care of your furnace that has kept your whole family warm this last winter? Can you afford to buy a new furnace every ten years and use one-third more coal?
Or will you spend $5.00 a year and have it cleaned, save one-third of your coal and lengthen the life of your furnace, with less dust and dirt coming from your warm and cold air pipes.
Make Your Appointment Now for Our All-Electric Machine
We Have One Price Only
WE CLEAN AND REPAIR ALL MAKES OF FURNACES
Lawn City Warm Air Heating Service
Phone 340
WE REPRESENT THE LARGEST INSTALLERS OF WARM AIR HEATING SYSTEMS IN N. E. IOWA AND ARE THE ROUND OAK FOLKS IN CEDAR FALLS.
The Round Oak makes good goods only and will continue to build that way.

▲

Left—This stuffer was also mailed last spring. It brought orders. It was mailed ahead of the stuffer above. Not so much was said, but the need for salesmanhip was not so acute as late in the spring.

▼

Now!

Save 1/3 of your Coal Bills

The United States Department of Commerce says: A coating of a quarter of an inch of soot in a furnace reduces its efficiency by one-half and if the soot is only one-eighth of an inch the furnace is one-fourth less efficient.

MAIL THE POST CARD OR PHONE US AT ONCE

The problem of getting efficiency from a furnace is now solved. THE SUPER SERVICE MACHINE and THE NEW SYSTEM—cleans quickly and safely—Reduces the cost to a minimum. Act now to eliminate your furnace troubles.

THE furnace in your home may be an excellent one—don't blame the furnace, and it's likely that your coal is alright. Large coal bills with a cold house may mean only that your furnace is dirty. A smoky furnace nearly always can be fixed easily. Our cleaning services will give you satisfaction.

See "1" at the top of this page.

1 Saving ½ of your coal next winter—would you like to save that? The best of the coal travels thru clean iron but this heat is stopped when the iron is covered with furnace soot.

2 Stuffing a furnace with coal is not a remedy, and why do all this shovelling and all the extra hard work?

3 Shaking grates and crowding on the coal will spoil the best of furnaces and it wastes the coal—a lot of extra ashes too—expensive, dirty and hard work.

4 A clean furnace means a clean house. If we clean your furnace now, you will know it's clean and ready. Enjoy this now.

5 Many residence fires are caused by clogged furnaces, pipes and leaks—reduce the hazard of fire in your home.

6 Cleaning down inside the registers and inside the pipes and on top of the pipes in the basement is part of this service. Protect the health of the family by getting rid of dust and germs.

7 Dust spoils wallpaper, paint, soils windows, spoils rugs, curtains, furniture and clothing, and costs much every year in added cleaning and it means no end of hard work.

THIS process is clean—no muss—no fuss—an expert cleaning man brings this equipment into your home. It is a light, very strong, small machine. He quietly and quickly does the work upstairs and down. It is his duty to give you a report and he leaves your house quietly—your furnace is thoroly cleaned but nothing is disturbed.

Low cost is made possible by a New Perfect Machine—that does quicker and easier work. YOU get the benefit of these things. Won't you phone for prices or mail the card now—get the prices—(about half the cost of former years).

You cannot afford not to have it done"

PHONE 699-R

or

Mail This Card Today

We repair all kinds of Furnaces

Post Card

USE ONE CENT STAMP HERE

Lawn City Warm Air Heating Service

903 Iowa St.

Cedar Falls, Iowa

This postcard was mailed out as one of the first efforts to get cleaning business. It did not bring the replies expected. One of the troubles was that it was mailed in the winter time. Dennis believes that owners don't like to have cleaning done in the winter, at least winter cleaning has been hardest to get.

of the cards mailed in February came back as late as September.

The latest method used by Dennis is salesman canvassing. This canvass is now going on. Here is what Dennis has to say about a salesman:

"It is a hard job to hire a salesman who will stay with the job of selling furnaces when the only leads he is given are the town's doorbells. But getting a salesman to sell cleaning is another proposition. Cleaning means a small priced order. The home owner will listen to a proposition to save money by investing $5.00 when he will slam the door if approached on a proposition to spend a hundred dollars or more.

"I pay this canvasser $21.00 a week. I believe in paying a man a salary if he can produce business. He is better satisfied on a salary basis and stands turndowns better. It takes a lot of calls to get even a cleaning order and a man working on commission is too apt to get discouraged. If he has a salary, even if it is a small one, he sticks at the job. My part of the job is to keep him going so that the business he brings in pays me for my expense.

"This charge of $5.00 for a cleaning job, pays little profit, but I count on the cleaning to bring in repair and replacement orders from which I do make a good profit. In most cases we get these replacement and repair jobs without competition. The trick is to close the order immediately.

"One interesting thing we have found—that when we clean a furnace this year we usually get another cleaning job next year. If we didn't land a repair job the first cleaning it is probable that the next year the furnace will need resetting, new smoke pipe or some other item.

"This canvassing for cleaning has enabled me to build up a complete card file of all the furnaces in town. When the furnace is inspected for cleaning, a complete history of that furnace is listed on a card the salesman carries. When that card is filled in, I know just what that owner needs. If he doesn't need any repairs this year, I know that next year he is likely to need new smoke pipe, a reset, or a new furnace.

"The card also lists all the heating complaints of that plant. For instance, the owner may say that one of the bedrooms is hard to heat. I explain that the room can be heated by putting in a size larger pipe, stack and register. Perhaps some additional cold air should be taken out of the house to make circulation better.

"If the owner states that he can't afford to do this work now, that is noted on the card. The card turns up again at intervals through my system of filing and sooner or later I find the owner ready and

(Continued on page 36)

BLOCK No. ..... Street ..... Salesperson .....

House No.	NAME	1st Call	2nd Call	3rd Call	FINAL

This card is a record of the canvassing efforts for every city block worked by the Dennis canvasser. These make a complete record of every heating plant in the district worked. Leads are followed up for additional work.

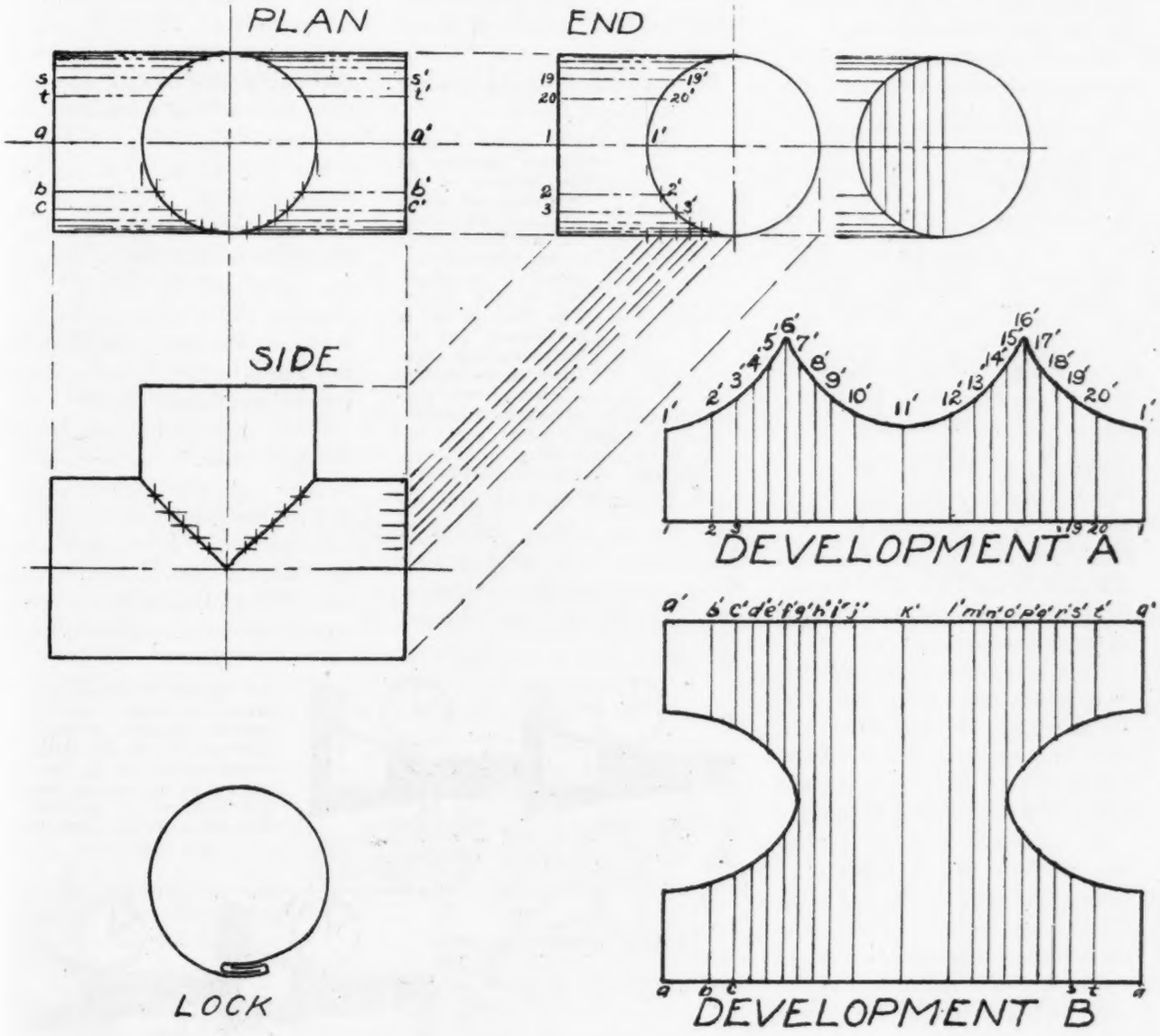
T-Joint Between Pipes of Equal Diameter

By **W. R. HAINES**
Contributing Editor

THE problem presented this week is a simple one, but as we wish this pattern series to be helpful to beginners, we present the simple problems as well as the difficult, special layouts.

A complete drawing is presented; first the plan view, then side and end views and stretchout. Note location of seam on the stretchout. By putting half of the tee opening on each end, it is much easier to cut out than the old way of knocking a hole with the hammer and then using the circle shears. I use the Stanley Unishears for this work, and they surely are an ideal

(Continued on page 32)



DEVELOPMENT OF T JOINT BETWEEN PIPES OF EQUAL DIAMETER

FAN BLAST ENGINEERING

By PLATTE OVERTON
Heating Engineer

THE installation of automatic temperature control in the school for which we are designing the fan blast system is of prime importance. The invariable result of hand control is overheating, fuel waste, and discomfort to the occupants of the building.

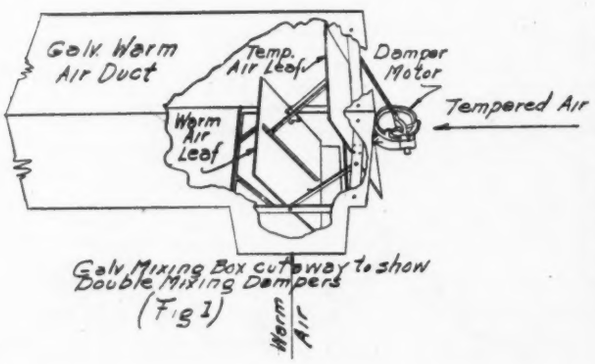
When the room becomes hot the natural procedure is for one of the occupants to open the windows. This results in drafts and excess heat loss. When the room becomes chilled and uncomfortable the windows are closed for a short period, the room is again overheated, and the cycle is repeated.

Automatic regulation is obviously desirable, hence we will discuss its installation in our school. It must be borne in mind that we are supplying all outside air in our installation while school is in session.

As explained in previous articles, we have two chambers containing air over the heaters—one the warm air plenum, and the other the tempered air plenum.

The warm air supply duct to the room is connected to these two chambers with a galvanized iron fitting we will call a mixing box. This mixing box contains a set of double mixing dampers as shown in Fig. 1. These dampers are actuated by the action of the thermostat in the room. If the temperature in the room drops below that desired and for which the thermostat has been set, the leaf on the tempered air side will start to close and of course this action will open the warm air leaf. If the temperature in the room rises, the action will be reversed.

The installation of the gradual action type of mixing damper is highly important in direct fired hot blast systems. Many failures of this system have been directly traced to the antiquated positive action "wide open or closed" damper.

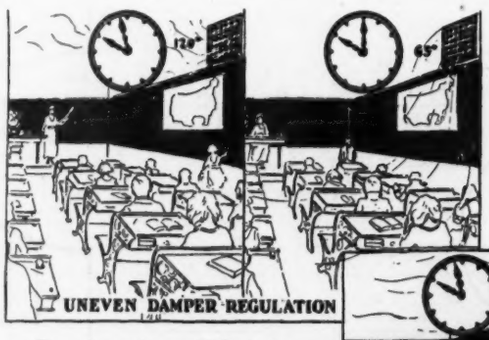


The double mixing damper operates at the junction of the tempered and warm air ducts. By swinging in this box more or less warm or tempered air is admitted to the leader. The flow of air is continuous, but the temperature is regulated by the amount of warm and tempered air admitted

Here it is readily seen that when the thermostat shifts the position of the mixing damper to supply cooler air, a stream of air too cool for comfort may strike the occupants before it reaches the thermostat. With the gradual action type the dampers will remain in various positions that allow both cool and warm air to pass into the duct, and the results will be those shown to the right in Fig. 5.

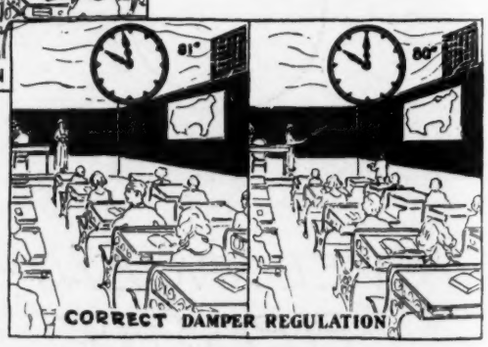
Fig. 2 shows sketch of the attic dampers. While school is in session the outside air damper is open and the two recirculation dampers are closed and the exhausted air from the rooms passes up the vent flues into the attic exhaust ducts and hence to the outside through the roof ventilators (Fig. 3).

When recirculating the janitor throws a switch in the basement to position marked "recirculation" and the damper in outside air intake, and those in the roof vents close and the recirculation dampers open. Thus all the air in the building is passed and repassed through



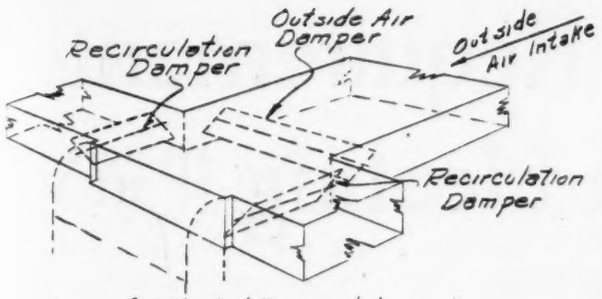
At the left is shown the effect of admitting air greatly changed in temperature through the inlets —one minute air is coming out at 120 degrees and the next at 65 degrees. The effect on occupants is not beneficial

Room temperature will fluctuate under this condition



At the right is the effect of properly controlled dampering. The fluctuation of temperature of incoming air is through a one degree cycle and temperature change is not enough to be noticeable

Room temperatures always the same



View of Outside & Recirculation Dampers (Fig 2)

This detail shows how 100 per cent outside air is taken to the heaters when classes are in session. During the night, the outside air duct is closed and 100 per cent recirculation is used to conserve fuel costs. This is how the ducts and dampers are customarily arranged

the system. This is the condition under which the system is normally placed at night and during the heating up process.

A furnace stat is installed in the warm air plenum and controls the drafts in the ash pan of the heaters. When the building temperature becomes normal and the mixing dampers are set for more cool air than warm the temperature will rapidly rise in the warm air chamber and the action of the thermostat in the warm air chamber will close the draft doors.

A similar stat in the tempered air chamber actuates the double mixing dampers in the by-pass that keeps this chamber at 65-70 degrees.

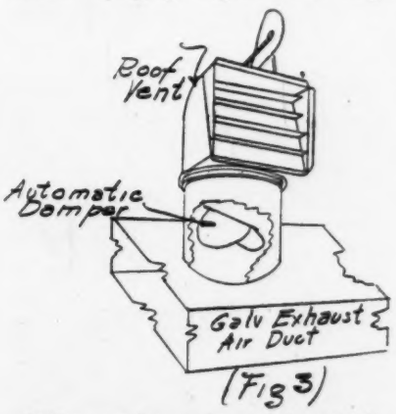
Our humidity is also regulated by this same system.

In the most central room (in this case the assembly hall) we place a hygrostat. This stat automatically supplies the heated air with the needed moisture by the regulation of the supply of water to the water pans over the heaters.

All the foregoing damper motors, stat and the hygrostat are operated by compressed air. The sensitive operations of the thermostats, furnacestats, and hygrostat, release or confine the compressed air that operates the motors or valves.

A motor compressor and storage tank are placed in some room in the basement and the air piped to the various stats and damper motors through small ⅛-inch pipes. The compressor is automatic and keeps the system under pressure at all times.

It should be borne in mind that the above described system is not confined to schools or public buildings. It may be and is installed in many fine homes. With this system every room may have separate and individual temperature control which is highly important in large homes with long, warm air runs and various exposures. With such a system it is of course necessary to install a plenum system and an individual run to each room that contains a thermostat.



(Fig 3)

When outside air is used, breathed air is exhausted through the vent stacks connected either to an exhaust fan or gravity ventilators like this

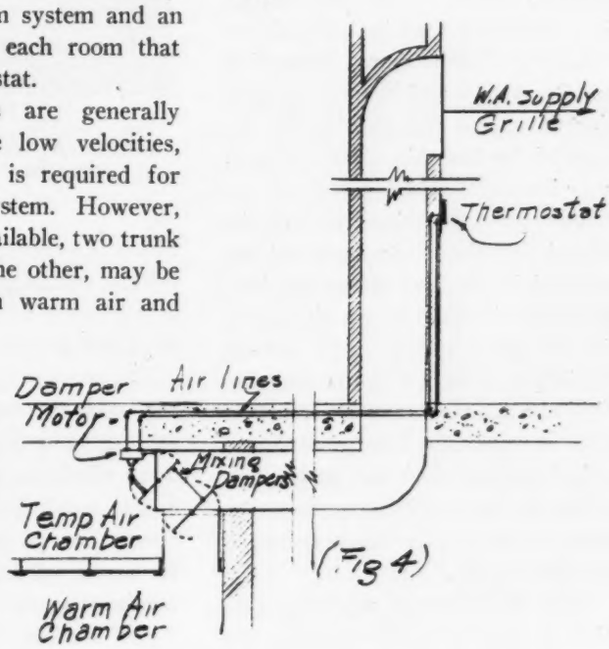
Individual runs are generally small and require low velocities, hence more room is required for ducts with this system. However, if head room is available, two trunk ducts, one above the other, may be installed, one with warm air and the lower one with tempered air. At the base of each supply riser, double mixing dampers are installed that allow either warm air or cool air to enter the stack, or a mixture of both.

More head room is required for this system, but less width of duct assembly.

As stated in the foregoing paragraphs, the entire automatic control system is operated by compressed air. In the event that anything goes wrong with the compressor or the motor that operates the compressor, or that the system is shut off, all the dampers to the various room are automatically left on "warm air" dampers that admit outside air close and the roof dampers (Fig. 3) close. This keeps the heat in the building.

The price for such a system depends on the number of rooms served. Prices run from $75 to $125 per room. The more rooms served, the lower the cost per room. A ten-room school will average from $90 to $120 per room, and a twenty-room school might run as low as $75 to $90 per room.

The cost of such a system is repaid to the owner in fuel saving and convenience. The satisfactory hand regulation of room temperature in school buildings with over two or three rooms is an impossibility.



(Fig 4)

The mixing dampers are actuated by the room thermostat. If the room calls for heat, the thermostat causes the double dampers to swing so that the opening from the warm air chamber grows greater

Electric Motor Requirements In Modern Heating [Part VI]

By **H. WEICHSEL**

Consulting Engineer, Wagner Electric Co., St. Louis

All of the arrangements just discussed for obtaining variable speed on the blower have the disadvantage that the speed which is obtained is not very positive. It means that if for instance the load on the blower changes, the speed changes; or if the load on the blower is kept constant but the line voltage changes, the speed changes. An idea of the influence of the line voltage variation on the speed variation is shown in Fig. 70.

It will be seen from this figure for instance that for the high speed connection the motor speed is practically independent of the line voltage. For the low speed connection on the other hand, the motor operates the blower at about 700 r.p.m. when the line voltage is 240 and operates at about 550 r.p.m. when the line voltage is 200. In other words, a line voltage change of plus or minus 10 per cent creates a speed change from 550 to 700 r.p.m. or plus or minus 12 per cent, which in some cases may be quite objectionable. Furthermore, depending on the design and connection used for the motor and also on the design of the fan, this speed variation may be considerably more.

Generally speaking, it can be stated that the lower the speed expressed in per cent of the synchronous speed of the motor, the larger is the speed change with voltage variation. Another disadvantage of this arrangement may be found in the fact that the low speed has a relatively low efficiency, as the machine operates on that part of the speed torque curve which usually is called unstable.

One of the great advantages of this arrangement of changing the speed of the motor by impressing different voltages on the motor, lies in the fact that a large number of speed steps can be obtained.

If it is necessary to have a relatively high efficiency at low speeds and furthermore to have a speed which is practically independent of voltage variations and load changes, it is possible to use so-called multiple speed motors.

The most evident way of obtaining such a machine consists in placing in a given motor two or more windings, let us say 4, 6, and 8 pole windings. While such machines are possible, they are not recommended for small units, as the winding space necessary for the stator windings is excessive. Consequently the motor becomes extremely large and expensive.

If it is satisfactory to use only two speeds which stand in the relation of 1 to 2, let us say 1800 and 900 r.p.m., or 1200 and 600 r.p.m. for 60-cycle motors, a relatively simple arrangement is possible, using only a single winding in the stator which can be so connected as to give 4 or 8 pole windings or 6 or 12 pole windings, etc.

How this can be accomplished is shown in Fig. 71. The main winding in this case is shown for a 2 pole, 4 pole connection. In the 4 pole connection, the coil groups are connected in series; and for the 2 pole connection, the coil groups are connected in parallel. The fields

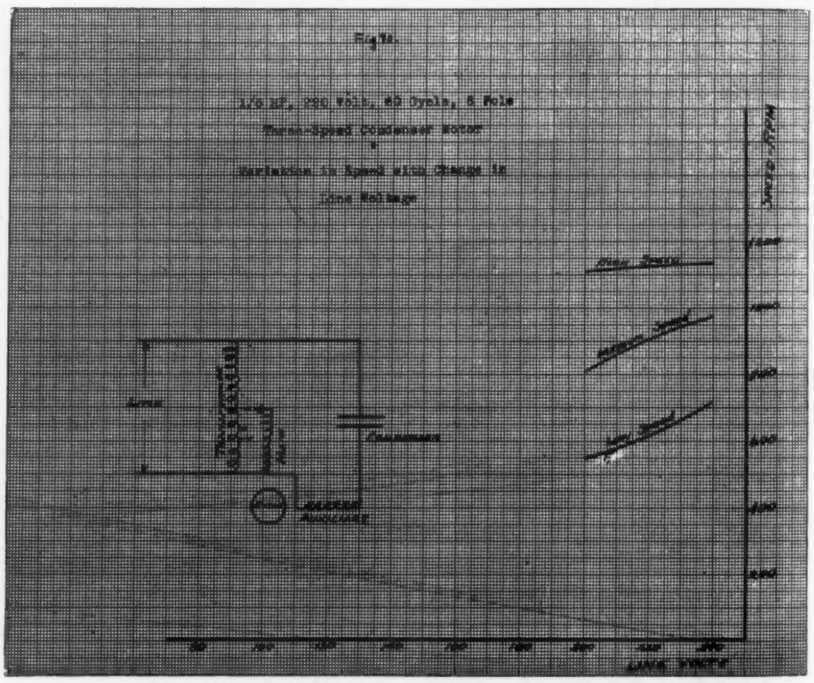


Fig. 70—This chart shows how motor speed changes with changes in line voltage. At high speed this variation is negligible, but at lower speeds small changes in load or voltage produce larger changes in motor speed

produced in these different connections are shown in the figures below.

However, a detailed study of the problem shows that if the auxiliary winding is connected in the same manner as the main winding and is displaced 90 electrical degrees from the main winding when connected, let us say, for 4 poles, it will be found that it is no longer displaced 90 degrees from the main winding when the latter is connected for 8 poles. On the contrary, the field produced by the auxiliary and main winding for the 8 pole connection coincides, which means the machine is unable to operate in this connection.

In order to overcome this difficulty, two means are feasible: One consists in not displacing the main and auxiliary windings exactly 90 deg. when connected for the lower number of poles. Consequently when they are reconnected for the higher number of poles, the field axis of the main and auxiliary winding does not coincide exactly and a starting torque is feasible for both the high and the low number of pole connections.

A better and more effective method consists in regrouping the auxiliary winding by different means than those shown for the main winding. This subject, however, is too much of a detailed problem to be discussed in these articles.

The speed torque characteristics which are obtainable with multiple speed motors are given in Fig. 72, which clearly shows that the intersection between the motor torque curves and the blower torque curves is very definite and consequently changes in load or the line voltage changes very little the operating speed of the machine.

How the actual connection of a multiple speed condenser motor is accomplished is shown in Fig. 73. In this particular arrangement,

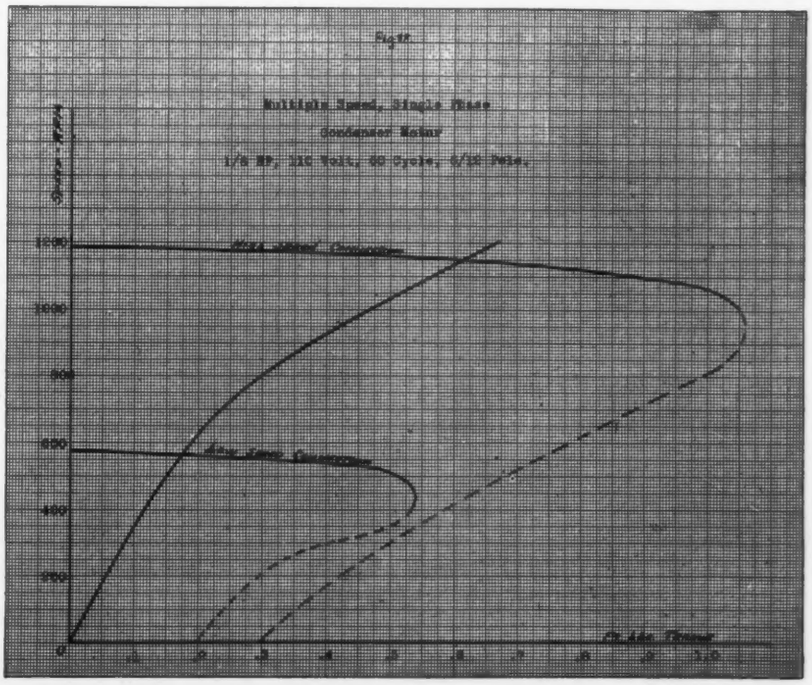


Fig. 72—This shows the speed torque obtained with multi-speed motors. Note that changes in line voltage or load have little effect on the speed of the machine

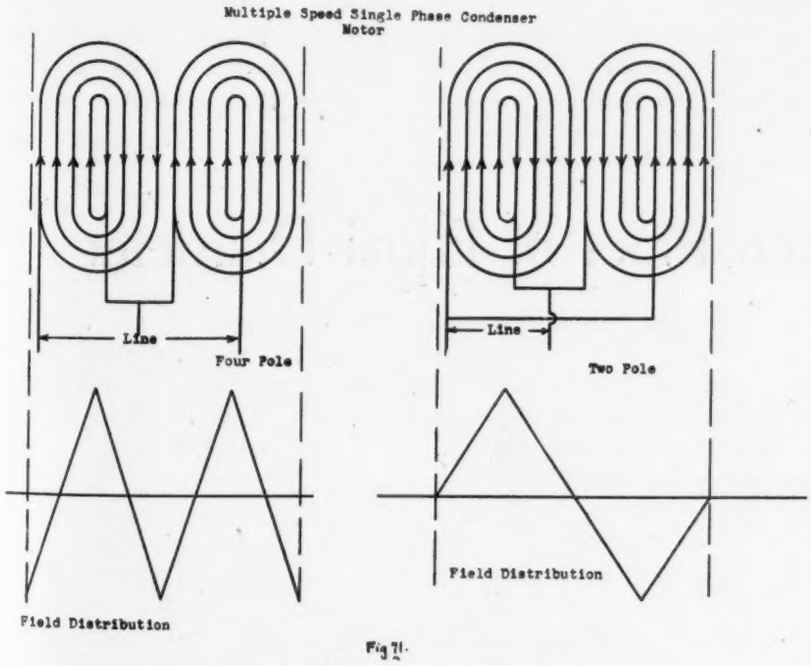


Fig. 71—Winding arrangement for multiple-speed motors with two definite speeds, the high being twice that of the low speed

three condensers are necessary.

From what has been said about condenser motors, it may appear that their only advantage lies in the fact that speed variation can be obtained, but this is a misconception, as another advantage of the single-phase condenser motor lies in the fact that machines of this kind can be built to operate very much quieter than standard single-phase induction motors. It is extremely difficult if not impossible to build, for instance, a 10 pole, ½ hp., 60 cycle, single-phase induction motor sufficiently quiet to meet the severe requirements of a heating installation, let us say, in a church. Machines of this kind are, however, feasible if the single-phase condenser motor is used in place of the standard single-phase motor.

The explanation for this lies in

the fact that the armature torque of a single-phase motor has 120 maxima for 1 second for a 60 cycle motor. If, on the other hand, a single-phase condenser motor is used, it is possible by proper proportioning of load and capacity and ratio K to produce an absolutely constant torque.

However, it must be realized that this *absolutely* constant torque is possible only at a definite load, for instance, full load. If the motor is loaded either above or below this value, the torque begins to have 120 cycle harmonics and consequently is noisier than at full load.

Before leaving the subject of condenser motors, it is necessary to point out certain characteristics of condensers. The condenser, as you know, is made of layers of paper and tin foil, the papers being extremely thin, and in order to obtain satisfactory insulation the paper is impregnated with some other insulating material.

In the older style of condenser, the impregnation consisted of wax, which was bee, paraffin, or some artificial wax, but in all these cases the manufacturer would not guarantee the condensers to be operated at a temperature above 100 to 110 degrees F.

It is readily seen from what has been said previously that if such condensers are used, for instance, in unit heater work, they should be located a sufficient distance from the heater so that in case the blower is shut off the increased temperature of the heater will not raise the temperature of the condenser to a value of 100 to 110 degrees F.

In order to overcome or at least minimize this shortcoming, the condenser manufacturers are now beginning to use oil instead of wax. There are two kinds of oil-insulated condensers—one which is called the oil-impregnated condenser, in which the paper is simply soaked in oil and then placed in a tin can with a wax filling between case and condenser. The manufacturer, on account of the wax filling, guarantees only slightly higher permissible temperatures.

Another construction is called the oil-submerged or oil-filled condenser, in which the paper and tinfoil actually rest in a can filled with oil similar to a transformer resting in an oil-filled case. Such condensers are usually considered to be satisfactory up to 150 to 175 degrees F.

It would lead too far to discuss the advantages and disadvantages of the different types of condensers at this opportunity. It may be sufficient to state that in some cases the heating engineers prefer to use machines without condensers, and in these cases it is desirable to use multiple-speed, split-phase motors.

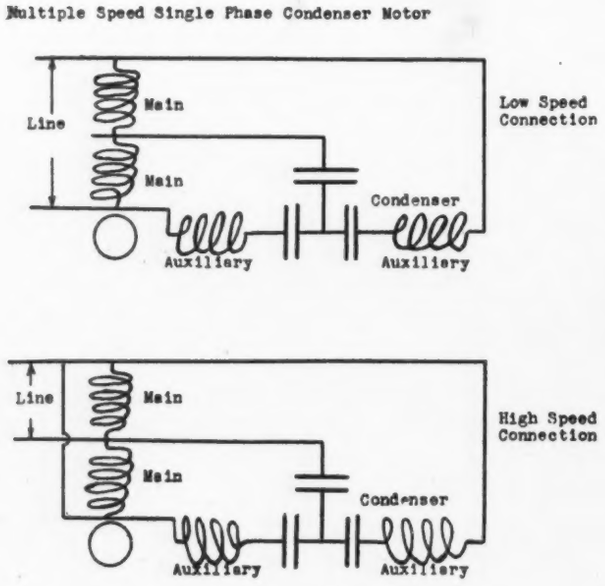


Fig. 73 — This shows the actual connection of a multi-speed condenser motor using three condensers

T-Joint Between Pipes of Equal Diameter

tool. In fact, we could not run our factory here in Marshalltown and continue to make Am-Pe-Co Blowers without our Stanley Unishears.

As many shops are not equipped with drawing boards, this layout can be made with dividers practically altogether. Starting with the end view, divide semicircle into parts 1, 2, 3, 20, 19, etc. Then make the end piece for tee any length you desire, and then lay out your circumference into the same num-

(Continued from page 27)

ber of parts, as DEVELOPMENT A. To get these lengths, simply set your dividers at 1-1′ on end view, transfer the same to DEV. A. Then 2-2′ and so on in the same manner until all are complete. This gives the T joint to fit the pipe. To lay out the hole in DEV. B, project lines in end view to plan view, intersecting 1 at a, 2 at b, etc. Lay out your pipe stretchout and divide into a, b, c, etc. From a to intersecting point of circle on plan is your starting point. Continue with points b, c, etc., to intersecting point on circle, and your layout is complete.

You will notice I have used the side elevation first to show the finished development and also to locate points 1, 2, 3, etc., on end view. In other words, drop points on plan to side view, and then with a 45° triangle, locate points on end view.

Sheet Metal in the Southwest's "Stud and Stucco" Houses

IN these days of change in architecture it is essential that the sheet metal contractor keep abreast of all developments else his work will be designed out of building.

A good example of this and also a good example of how contractors keep ahead of developments is found in the Southwest where light house construction is favored.

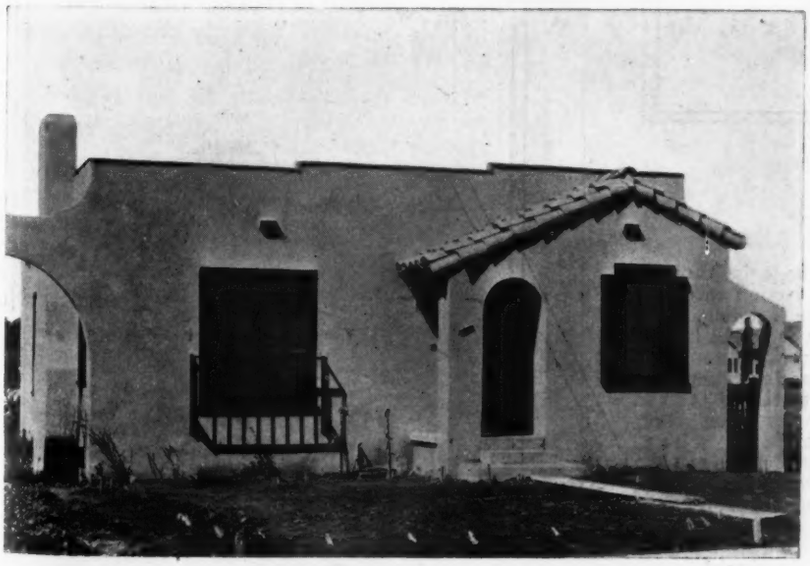
In these buildings "stud and stucco" construction has been almost universally used with the result that the sheet metal craft has played an important role in devising waterproofing methods for buildings of this character.

That the sheet metal contractor is not always "on the job," however, is graphically shown by the photograph accompanying this article.

These photos show ."how not" and "how to." Study them. Perhaps the same idea can be applied to construction in other parts of the country.

"What's Wrong with This Picture?"

1. Front down spout empties onto the front steps, rendering them impassable in rainy weather, and the roof water will be trapped near the foundation, eventually undermining it and causing settlement of the building.
2. No metal flashings are used over the doors and windows; rain water will run down behind the wooden "stucco molds" and ruin interior finish of rooms.
3. Top of firewall is finished in stucco, which will eventually crack in two places—along inner and outer edge of firewall, allowing the water to run down behind the roof flashings and reach the plastered ceilings of the rooms inside.
4. The sheet iron louvres of the "California cooler" vent are too flat. A driving rain will blow water on to the food stored therein.



It Should Be Done This Way

1. Window and door head casings are protected by sheet metal strips nailed to wood sheathing of the building and projecting over the outer edge of the head casing to form a perfect flashing and drip surface.
2. Top of firewall is finished with sheet metal cap which projects out beyond the finished stucco line of the wall outside, and turns down over the regular roof flashing inside the firewall thus forming a permanent watertight joint.

At least every sheet metal contractor who works with particular architects should explain how his services make for better houses.

GRAVITY EXHAUST VENTILATION

Determining Fan Ventilator Sizes

By **PAUL R. JORDAN***

The letter reproduced here brings up once more the question of how to determine the necessary size for a ventilator or ventilators on a typical plant needing ventilation badly.

If only more contractors would admit lack of information, perhaps better installation would be made.

Following is what Paul Jordan has to say about this:

Dear Sirs:

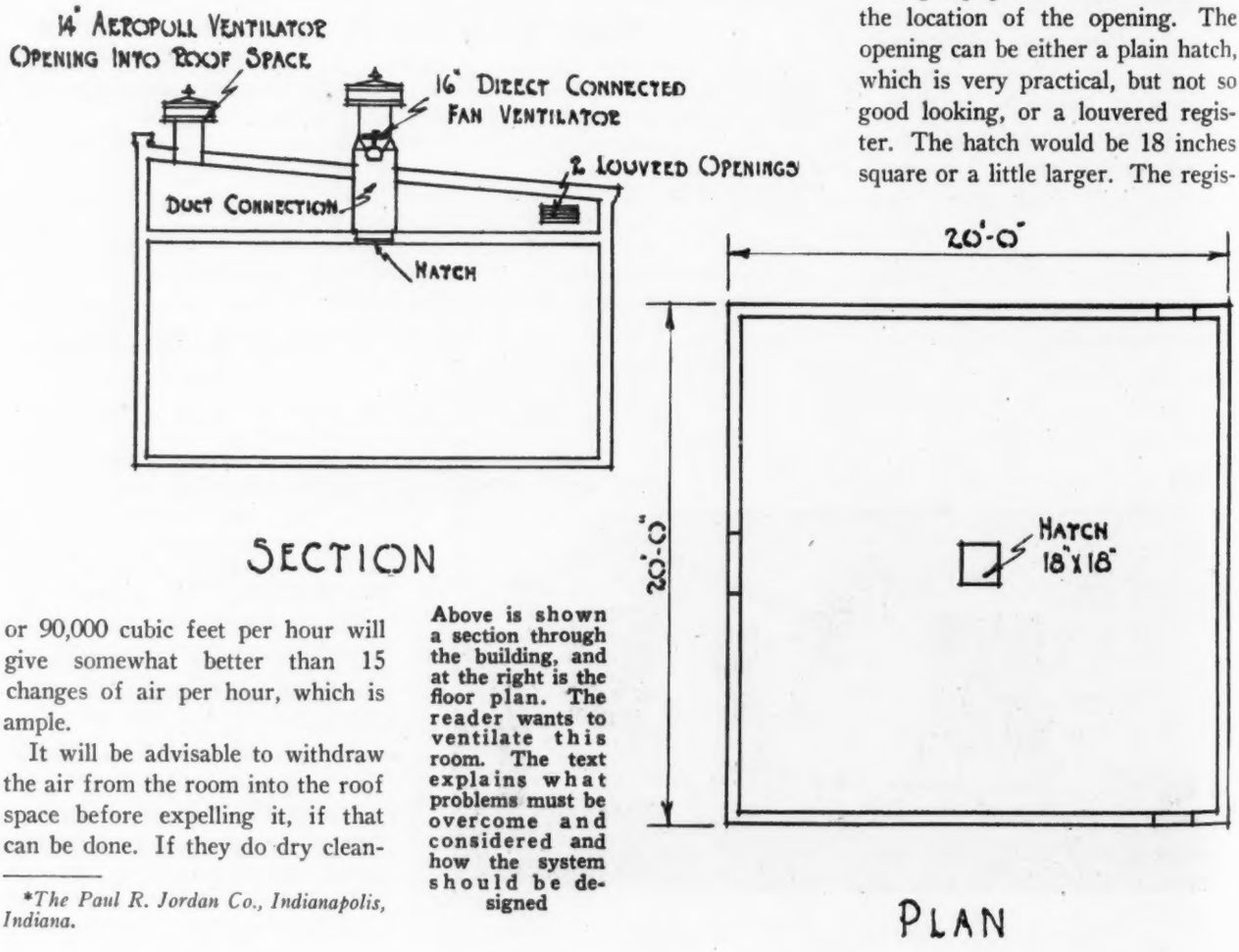
We are enclosing herewith sketch of a building occupied by a cleaning and pressing establishment, size of building 20 by 14 feet, north exposure, all-glass front, one story with an 8-foot wall and having two window vents 2 by 3 feet. We ask that you advise us the proper size of fan ventilator, direct connected, for this room.

Very truly yours,

An area 20 by 20 by 14 feet gives a cubical capacity of 5600 cubic feet. A 16-inch fan ventilator rated at 1500 cubic feet of air per minute or 90,000 cubic feet per hour will give somewhat better than 15 changes of air per hour, which is ample.

It will be advisable to withdraw the air from the room into the roof space before expelling it, if that can be done. If they do dry cleaning in this building it cannot be done. If, on the other hand, they only do pressing and spot removing, sending their dry cleaning out, then roof space ventilating probably can be handled in conjunction with the room ventilation. If this is done the fan ventilator should be installed in the front of the building in the middle of the highest part of the roof.

The opening through the ceiling into the roof space would depend on the location of the two windows. Also the location of any heat producing equipment would influence the location of the opening. The opening can be either a plain hatch, which is very practical, but not so good looking, or a louvered register. The hatch would be 18 inches square or a little larger. The regis-



Above is shown a section through the building, and at the right is the floor plan. The reader wants to ventilate this room. The text explains what problems must be overcome and considered and how the system should be designed

**The Paul R. Jordan Co., Indianapolis, Indiana.*

ter should be figured on about the same basis. This could be broken up into two registers to conform to stock sizes.

In case roof space ventilation cannot be handled in conjunction with the room ventilation as outlined, the fan ventilator will have to be connected with the room by a duct. In this event, in order to give satisfactory results from a standpoint of heat removal, roof space ventilation should be handled separately.

Applying the formula for roof space ventilation to this, we have 20 times 20 or 400 square feet as the roof area. Multiply this by 80 and we get 32,000 as the amount of air necessary to ventilate this roof space. A 14-inch stationary ventilator will handle this reasonably well, although a 14-inch rotary would be better. A plain round base will be satisfactory for the stationary ventilator.

Provision also must be made for the air to come into the roof space, in case the roof space ventilation is handled separately. Inasmuch as no air is coming into the roof space from the room below, air must be taken into it from the outside, which means that louvered openings must be provided for this purpose. These openings should be at the lower end of the roof as near to the corners as the roof space will allow. Each louvered opening should have approximately 100 square inches of free area and the louvers should be so arranged as to exclude rain while letting in air.

Here's an important point. The cost of the material is about as follows: Fan ventilator, $60.00. One 14-inch stationary ventilator, $4.80. One base, $2.70; damper and chain, $1.50. It should be borne in mind that while fan ventilator prices regularly include bases, ventilator prices regularly do not include bases; therefore, the contractor will have to make his own 14-inch base or else buy it. Total cost for such an installation, $69.00. The labor should be about at a scale of $1.00 per hour. To this the contractor can easily add a profit margin sufficient to make the job worth going after.

It may seem strange that fan ventilators regularly come complete with bases while other ventilators are priced regularly without bases. This is due to the fact that fan ventilators require special base construction, while ordinary ventilators do not. Sheet metal contractors usually prefer to make their own bases where it is possible, and this is possible with ordinary ventilators.

I enclose layout showing everything where roof space ventilation has to be handled separately. In case roof space ventilation can be handled in conjunction with room ventilation, eliminate the 14-inch stationary ventilator with louvers, and the connection from the fan ventilator to the room. Also change the location of the fan ventilator bringing it up to the location shown for the 14-inch stationary ventilator, but leaving the hatch opening in the same location as shown.

SHEET ALUMINUM ON CLEVELAND STADIUM

(Continued from page 23)

frieze are identical with those outside to simplify fabrication. The application is also like that of the outside with the top sheet locked to the back flashing and the lower edge turned under the roof. There is some 1500 feet of this frieze on the playing side.

The very magnitude of this contract makes the project one of the outstanding sheet metal jobs of 1931. That it was erected without delays and without conflict speaks well for the organization which planned and placed it.

The contractor is rightly proud of this huge project. Approximately 90 per cent of the entire job was erected in less than 12 weeks. This rapid schedule was necessary to deliver the stadium in time for the opening.

IN the next issue we will publish a heating story giving the details of an installation made more than 20 miles from public service lines. The installation is fully automatic, with some details of casing design and duct arrangement well worth study. Watch for this article.

CAN YOU TELL ME ?

Lawn Mower with Sickle Attachment

From Noble Sheet Metal Works, Rhinelander, Wisconsin.

Where can we get two 18 or 20 inch power lawn mowers with sickle attachment?

Ans.—Gilson Bolens Manufacturing Company, Port Washington, Wisconsin.

Restaurant and Theater Cooling Equipment

From C. Ben Bjornstad Company, Spencer, Iowa.

Who manufactures restaurant and theater cooling and ventilating equipment?

Ans.—American Blower Corporation, 228 North La Salle Street, Chicago, Illinois.

"Spee-Dee-Heet" Electric Furnace

From Tom Fullerton, Topeka, Kansas.

Who manufactures the "Spee-Dee-Heet" Electric Furnace?

Ans.—Booth Electric Company, 20 North Wacker Drive, Chicago, Illinois.

Savory Roaster

From Walter H. Ziegler, Farmland, Indiana.

Who manufactures the Savory Roaster?

Ans. — Republic Metalware Company, 1800 South Kilbourn Avenue, Chicago, Illinois.

Mil Can Bottoms

From Walter H. Ziegler, Farmland, Indiana.

Where can we get milk can bottoms for 5, 8 and 10 gallon cans?

Ans.—Creamery Package Manufacturing Company, 1243 Washington Boulevard, Chicago, Illinois; Solar-Sturgis Manufacturing Company, Melrose Park, Illinois.

Roofer's Supplies

From Glenn Flesher, Centerville, Iowa.

Where can I buy roofer's supplies such as tar melting pots, roofing mops and roofing derricks?

Ans.—Bayonne Steel Products Company, Newark, New Jersey; Merchant & Evans Company, Washington Avenue and 21st, Philadelphia, Pennsylvania.

Screw Caps

From Hermon F. Luthe, Dubuque, Iowa.

Where can I get screw caps the same as are used on oil cars?

Ans.—Berger Brothers Company, 237 Arch Street, Philadelphia, Pennsylvania. *Chicago Distributor,* J. L. Perkins, 140 South Dearborn Street.

Centrifugal Pump

From Edwards Maytag Company, Enid, Oklahoma.

Where can we get a small centrifugal pump that will deliver about thirty gallons of water per hour?

Ans.—Great Lakes Supply Company, 9342 Ewing Avenue, Chicago, Illinois.

Float Valves

From Edwards Maytag Company, Enid Oklahoma.

Where can we get small compact float valves to handle thirty gallons of water per hour?

Ans.—McAlear Manufacturing Company, 1901 South Western Avenue, Chicago, Illinois.

Gurney Heating Mfg. Co.

From Geo. R. Baker, Alpena, Michigan.

Where is the Guerney Heating Manufacturing Company located?

Ans.—93-95 Oliver Street, Boston, Massachusetts.

Rathbone, Sard & Company

From Henry Kesler, El Paso, Illinois.

Where is the Rathbone, Sard & Company located? Where can we get repairs for their furnaces and ranges?

Ans.—The Rathbone, Sard & Company has consolidated with the Standard Gas Equipment Company of Aurora, Illinois. The Northwestern Stove Repair Company, 662 West Roosevelt Road, Chicago, Illinois, can furnish repairs for all of their furnaces and ranges.

Asphaltum Paint

From E. Van Spyker, Holland, Michigan.

Who makes an asphaltum paint?

Ans.—Wm. Connors Paint & Manufacturing Company, Troy, New York; Lastik Products Corporation, Oliver Building, Pittsburgh, Pennsylvania.

Radiator Cores

From C. Engel & Sons, Mayville, Wisconsin.

Who makes radiator cores?

Ans.—Faber-Schneider Radiator Company, 2317 South Wabash Avenue, Chicago, Illinois; Fedders Manufacturing Company, 5101 West Madison Street, Chicago, Illinois; G. & O. Manufacturing Company, New Haven, Connecticut; McCord Manufacturing Company, Detroit, Michigan; Perfex Radiator Company, Racine, Wisconsin; Terwedo Manufacturing Company, Oshkosh, Wisconsin.

Brass Letters

From Edward Kelly, Carthage, Illinois.

Where can we get the letters "CLASS 1931" in brass with lugs to put them in fresh cement?

Ans. — Friedley-Voshardt Company, 733 South Halsted Street, Chicago, Illinois.

DENNIS MAKES MONEY WITH CLEANING

(Continued from page 26)

with money to have the work done. I get the job. If I didn't get into the basement the first time on cleaning I wouldn't know what was needed.

"In case of a lack of funds, either cleaning or repair work, can be definitely booked for a later date. The owner knows I make this booking and so is not surprised when I come back at that time and try to get him to place the order. In most cases I get the job then.

"Furnace cleaning is not a side line. It is a sure-fire method of getting a first time job and establishing yourself for more work later. Another advantage is that cleaning is an all year round proposition. We clean during the summer and we clean during the winter. This means a steady income which may be the back log of the business, especially in these times when work is hard to get and money not too plentiful."

NEW ITEMS and NEWS ITEMS
From and about the Manufacturers and Jobbers

Revere Copper Appoints New Officials

Announcement is made of the appointment of J. A. Doucett as vice-president and general sales manager of Revere Copper and Brass, Inc., with offices at 230 Park Avenue, New York City.

Mr. Doucett was previously vice-president and assistant general sales manager. Before that he was president of the Michigan Copper and Brass Company in Detroit, now the Michigan Division of Revere. Formerly he was associated with the American Brass Company in their branches at Buffalo and Kenosha.

Announcement is also made of the appointment of Vincent W. Allen as manufacturing manager of the corporation. Mr. Allen is to be located at the general offices of Revere at Rome, New York. He is coming from Detroit, where he has been works manager of the Michigan Division. Mr. Allen was previously connected with the American Brass Company, also.

Emerson Furnace Blower for Warm Air Heating Systems

Among the outstanding improvements embodied in this furnace blower are direct drive—no belts or pulleys, three-speed operation, adequate air moving capacity, flexibility of speed regulation, quietness of operation and high motor efficiency with low starting current.

Three operating speeds are provided by a snap switch on the control unit. Connecting the three leads from the snap switch to any of the eight terminals in the control unit provides the three most desirable speeds to suit each individual installation. Performance obtainable with the Emerson Furnace Blower ranges from 300 to 820 r.p.m. with air deliveries from 955 to 2540 c.f.m. FREE.

In the design and construction of this furnace blower, Emerson engineers gave special attention and consideration to the matter of quiet operation. It was achieved in three ways:

(1) By having the blower wheels connected directly to the motor.

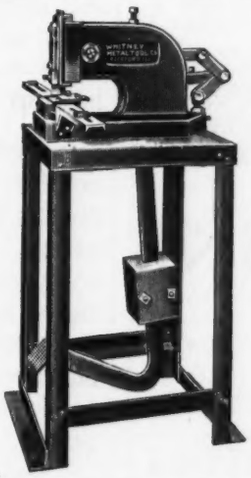
(2) The blower wheel is of the latest improved design and moves a large volume of air with the very minimum of sound. Backward curved blades are used.

(3) The motor is of special design and is built to assure quiet operation.

Whitney Metal Tool Co. Announces New Punch

Whitney Metal Tool Co., 751 Race Street, Rockford, Ill., is placing on the market a new No. 28 Toggle Lever Foot Press which has many exclusive features.

Capacity of this press is a 2-in. hole in 16 gauge. Throat depth 7 in.; height of



throat 4 in.; slug clearance hole, 2¼ in. by 4¼ in. Stroke of ram 1 in. travel.

It has adjustable ram regulations, positive stop locking against crank arm. Adjustable foot pedal, six laminated hardened and ground tool steel plates to take up the wear and the laminated discs can be arranged to adjust the stroke position of the ram one-half inch up or down. Has bolster plate type die holder. The bolster plate is provided with a T-slot to clamp on stops or stripper plates.

Speed of machine 100 holes per minute.

F. Meyer & Bro. Company New No. 49 Catalogue

F. Meyer and Bro. Co., Peoria, Illinois, have now ready for mailing their new catalogue, Number 49.

The catalogue is attractively bound in a silver, black and magenta and contains almost 100 pages of the company's products.

The catalogue contains in the forepart some of the interesting details of the company's history, and a list of jobbers. Following this there is illustrated and catalogued their line of furnace fittings, registers, and allied products manufactured or handled.

All items are fully covered by listings of sizes and prices. Many illustrations of typical and approved installations are shown.

New Handbook on Oil Heating

Information of great practical value to the builder in the construction of an oil heated home or building is contained in the new "Handbook of Oil Burning" just published by the American Oil Burner Association. In addition to authoritative information, charts, tables and descriptive illustrations relating to the use of oil as a fuel, the book discusses installation and construction details, ordinances and regulations on oil burners and equipment, tank installations, the determination of heating capacity requirements and the construction of the basement.

Printed in pocket size for convenience, the new handbook contains 629 pages including 123 tables and 358 illustrations and charts spread over 24 chapters. It can be had ($3) at the association headquarters, 342 Madison Avenue, New York.

Payne Furnace and Supply Appoints Representatives

The Payne Furnace and Supply company, Beverly Hills, Calif., announces the appointment of new mid-western representatives. Harry Thorpe will represent the company in the states of Missouri, Kansas, Nebraska and Iowa. Mr. Thorpe will have his headquarters at 304 North Delaware Street, Independence, Missouri, and will contact dealers, jobbers and prospective users of Payne heating equipment and will be in a position to give them any assistance or service they require in planning a proper heating system, whether it be for residential, industrial, or other types of buildings.

Oscar Wagner will represent the company in the same capacity throughout the states of Tennessee, Kentucky, Southern Ohio, Indiana, and Illinois. Mr. Wagner's headquarters are at 682 South 43rd Street, Louisville, Kentucky.

E. L. Kokenge Now in Charge of Premier's Western Territory

Announcement is made by the Premier Warm Air Heater Company, Dowagiac, Mich., that E. L. Kokenge now has charge of Western Ohio territory sales with headquarters at Lima.

"Ed" will handle the entire Premier line of DeLuxe and Duo-WELD basement furnaces.

THE WISE OWL SAYS: "Wise Buyers buy WISE"

LET US WISE YOU UP ON The WISE BALANCED LINE

2 WISE BIG 3 SERIES 4 WISE

Possibly you have never taken the time to investigate the WISE *BALANCED* LINE.

You will find it wise to let us tell you of the BIG 3 SERIES which make up the Wise *BALANCED* Line.

This gives you a unit that meets every price range and allows you to compete on every job— large or small.

Take the time. Let us "wise" you up on the Wise *BALANCED* Line.

WRITE FOR CATALOGS

THE WISE FURNACE CO.

AKRON - - - OHIO

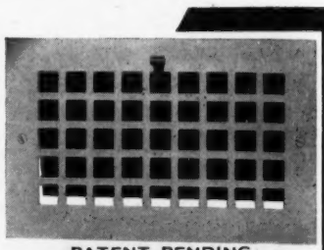
WISE DEALERS SELL WISE FURNACES

FORCED AIR REGISTERS *for EVERY Requirement!*

—built to meet the particular conditions that forced-air heating imposes. Inconspicuous—yet good-looking. First quality construction throughout. Both sidewall and baseboard types in both 1-piece and 3-piece construction, with intake to match.

All popular forced-air sizes in standard finishes available for prompt delivery. Special sizes may be had with slight delay. Any finish can be matched exactly.

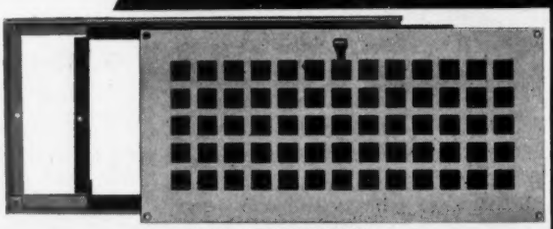
If you haven't already received our circular on forced-air registers for insertion in our No. 28 Catalog, write for it now. It gives the sizes, finishes, complete descriptions, and a chart for selecting the correct size register for every purpose.



PATENT PENDING

No. 3350 One-piece Sidewall Register, designed to overlap wall opening. One-piece baseboard registers and cold air returns to match.

Below: New 3-piece construction employed in our No. 3351 Sidewall Register (designed to fit flush with plaster) and our No. 3151 Baseboard Register.



PATENT PENDING

HART & COOLEY MFG. CO.

CHICAGO, 61 W. Kinzie St.
NEW YORK, 101 Park Ave.
PHILADELPHIA, 1600 Arch St.
BOSTON, 75 Portland St.
NEW BRITAIN, CONN.—NASHUA, N. H.

Factories at Holland, Mich., New Britain, Conn., Nashua, N. H.

Registers for all purposes. Also a complete line of Furnace Regulators, Dampers, Pulleys, Chain, and the H. & C. Automatic Heat Control.

Say you saw it in AMERICAN ARTISAN—Thank you!

Are You Working Under a Handicap?

Trying to build a business with one type of furnace is just as out-of-date as the practice of installing 8-inch heating pipes on all jobs and expecting uniform heating results. Neither method will prove successful and are handicaps to warm-air heating progress.

Heating requirements have changed and business methods must be changed to conform with them. "AFCO" Dealers are among the leaders in the industry because they have many important sales advantages—one of them being a complete line of boiler plate furnaces, cast iron furnaces, gas furnaces and assembled units for homes and business buildings—a heating system for every requirement.

AFCO
TRADE NAMES REGISTERED U.S. PATENT OFFICE
THERMO

Open the door to opportunity—get rid of your handicaps—send for the "AFCO" Dealer plan which gives the full facts—it will reach you promptly and without obligation.

American Furnace Co.

2719-31 Morgan Street, St. Louis, Mo.

Manufacturers of

"THERMO" Cast Iron Furnaces (Two Types)
"AFCO" Boiler Plate Furnaces (Three Types)
"AFCO Duo-Blo" Industrial Unit Heaters
"AFCO DeLuxe" Domestic Healthful Heating Systems
"THERMO" Gas Furnaces (Four Types)

Within One Mile

Is Business Which Will Keep Your Shop Busy All Summer. Get it, with this Snappy One-Man Unit

Zoller at Franklin, Indiana, only 5678 population, with three canvassers and our PLAN BOOK, cold turkey, in two and one-half hours, in the rain, took forty-three contracts for cleaning furnaces; 43 jobs in 2½ hours.

What interests you—two prospects will want new furnaces; thirty will want parts. 2½ hours canvassing.

Why does Zoller do cleaning? Because he makes good money on cleaning alone, more money on furnaces, much more money on repairs; which he sells because he holds old customers and he makes so many new ones. Your Super Suction will pay for itself in the first month. Three golden months left in this year—eight in each year to follow. Why not ask for a free trial and take these profits for your own?

You get more than a machine; you get a well-rounded business and a PLAN BOOK which makes it pay from the start. You get a complete supply of direct advertising printed with your name, address, phone; also prospect cards.

Dealers say that our right start is worth more than they pay for the machine. What good is a cleaner without the best plan to work it?

The National Super Service Company
1944 No. 13th St., Toledo, Ohio

Without obligation, send me the free PLAN BOOK which helps sell new furnaces and repairs, and tell me how I can try the cleaner free.

Name.....

City..... ***State***.....

Say you saw it in AMERICAN ARTISAN—Thank you!

Now! You Can Have An Exclusive Dealer Proposition on U. S. FURNACES

"furnaces that make selling easy"

Our new policy of exclusive dealer distribution has received nation wide approval. Dealers everywhere are finding the U. S. Furnace exclusive dealer proposition most profitable. You will too. Why not investigate?

The Heaviest Furnace Made with Many Unusual Features

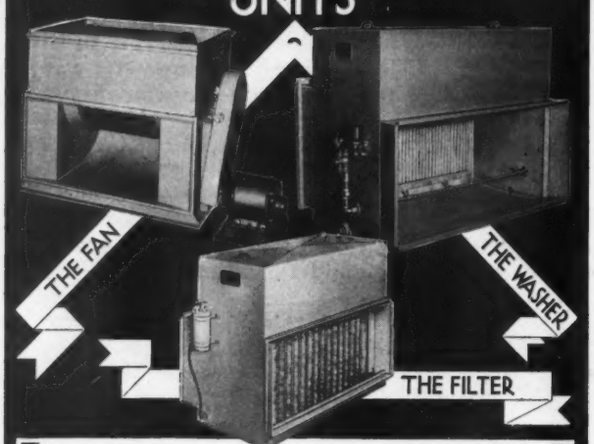
DOUBLE JOINTS—NO BOLTS
NO CEMENT
ONE PIECE CONE SHAPED
DEAD CENTER GRATE
A TEN YEAR GUARANTEE
ELIMINATION OF ALL DOOR JOINTS

WIRE WRITE OR PHONE IMMEDIATELY FOR EXCLUSIVE DEALER PROPOSITION

▼

The United States Furnace Company
724 Market Street **Youngstown, Ohio**

SILENTAIR
AIR CONDITIONING UNITS



The tremendous success of SILENTAIR AIR CONDITIONING UNITS results, in no small measure, from the fact that they are MATCHED UNITS. Easily installed with any warm air furnace they bring splendid profit to dealers and comfort and economy to home owners. Write for descriptive literature.

A. GEHRI & CO., INC.
Factory & Main Office - - - - Tacoma, Washington
Eastern Sales Office & Warehouse, Baltimore Trust Bldg., Baltimore

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BERTSCH TREADLE SHEAR

SQUARES, TRIMS AND SLITS

all sheets 14 gauge or lighter

Write for Catalog "g" Today

BERTSCH & CO., Cambridge City, Ind.

Keep Moisture Out of Smoke Pipes

with the
"NO-DAMP"
It's a
1 **Draft Control**
2 **Thimble**
3 **Protection Against Moisture**
4 **Pipe Saver**

IT SELLS ON SIGHT —EASY TO INSTALL

Made of Cast Iron

Write today for circulars and prices

EISSLER HARDWARE
209-211 Fifth Street **Aurora, Illinois**

Say you saw it in AMERICAN ARTISAN—Thank you!

WHILE YOU TRAVEL ON LIFE'S HIGHWAY—

you see such signs as...

CROSS roads—Danger—Bad Curve—Stop—R. R. Crossing—Skull and Cross Bones. You, in sober judgment, slow down and proceed with caution! Just so with our economic spree—it's a case of sobering up.

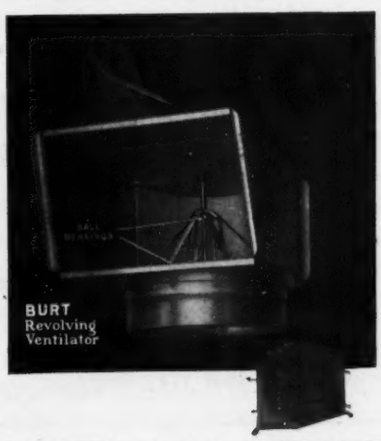
The manufacturers who made boiler plate furnaces under their own name and trade-mark for years are building a better heater than is offered in the BOOTLEG variety. A good furnace dealer knows that a high grade product is never sold under Bootleg methods.

Compare Peerless boiler plate heaters with others. They are the one outstanding product of craftsmanship, and always sold under the name of Peerless.

The PEERLESS FOUNDRY COMPANY

Pioneers in Warm Air Heating Since 1895

INDIANAPOLIS , , INDIANA



The

GRAVITY VENTILATOR

With the Big Pulling Power

The Burt Revolving Ventilator owes its leadership to the funnel shaped openings in the back which increase the speed of the wind action and give increased pulling power. Ask our Engineers for details.

The BURT MFG. Co.

Ventilators-Oil Filters-Exhaust Heads

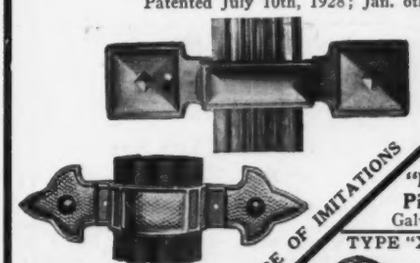
930 S. HIGH ST. AKRON, OHIO

RIVAL STRAP CORP. 308 WEST 20th ST. NEW YORK, N. Y.

The "RIVAL" and "FITRITE"

One-Piece Ornamental Leader Straps

Patented July 10th, 1928; Jan. 6th, 1931



Made in six styles. Write for folder showing complete line and sizes.

STRAPS SOLD THROUGH JOBBERS ONLY

BEWARE OF IMITATIONS

"Fitrite" Adjustable Pipe Snow Guards

Galvanized Iron or Bronze

TYPE "X"

"FITRITE" Bronze ROOF STRAINERS

3 Types. For Roofs having inside cast iron leader. Type "X" also made in Mal. Iron.

"FITRITE" Mop heads and Staples

Malleable Iron

"FITRITE" Bronze Beehive Strainer

For Round Leader 3"-4"-5"-6"-7"-8" diameter

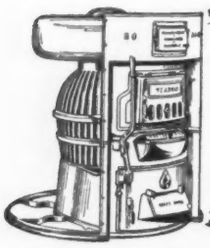
"FITRITE" SKYLIGHT GEARING

Iron or Bronze ⅜"-½" and 1" sizes. Made also for chain operation

Write Dept. "A" for full details and prices. Telephone: CHelsea 3-2400

DAVID LEVOW 308 WEST 20TH ST. NEW YORK

Say you saw it in AMERICAN ARTISAN—Thank you!



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Vernois
Write
for Details
Mt. Vernon Furnace & Mfg. Co.
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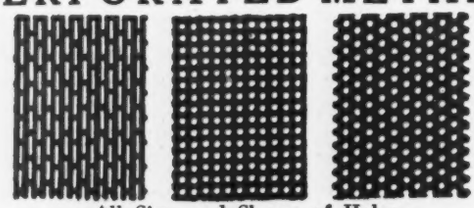
The Viking Shear

Compound lever handle—removable blades. Upper blade away from mechanic enabling easy following of work—an exclusive Viking feature.

Sold Under a Guarantee—Send for Particulars

VIKING SHEAR CO., Erie, Pa.

PERFORATED METALS



All Sizes and Shapes of Holes
In Steel, Zinc, Brass, Copper, Tinplate, etc.
For All Screening, Ventilating and Draining
EVERYTHING IN PERFORATING METAL

THE HARRINGTON & KING PERFORATING CO.
5649 FILLMORE ST.-CHICAGO, ILL., U. S. A.
NEW YORK OFFICE, 114 LIBERTY ST.

STOVE DOOR KNOBS

Nickeled,
Mahogany and
Walnut Finishes

We Have a Great Variety of Shapes and Sizes

Write Dept. F for Samples and Prices

THE FANNER MFG. CO. BROOKSIDE PARK, CLEVELAND, OHIO

CHICAGO STEEL SLITTING SHEAR

LIGHT—POWERFUL
DURABLE

Capacity 10 gauge sheets
Any Length or Width
Flat Bars 3/16x2"
Weight 22 pounds

Price $15.00 Net
F. O. B. Chicago

Made of pressed steel and equipped with hold-down. Blades of highest grade crucible steel. Most indispensable high grade shears made. Equal to other shears selling at over twice the price. *ORDER YOURS TODAY.*

DREIS & KRUMP MFG. CO., 7404 Loomis St., Chicago

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When you have finished reading this issue of AMERICAN ARTISAN, pass it on to others in your organization, marking the articles in which they should be particularly interested.

Then file it for future reference. You never know when you will encounter a problem in your business that is covered in this very issue.

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More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

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MARSHALLTOWN · IOWA
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The CORRECT AIR MACHINE

for

COOLING

— WRITE FOR DETAILS —

The KORECTAIRE IS a positive blower—it humidifies the air—it cleans it. It is the most *quiet* blower on the market. It's easy to install. Ask for illustrated circulars, quotations, and information on Korectaire for cooling, NOW.

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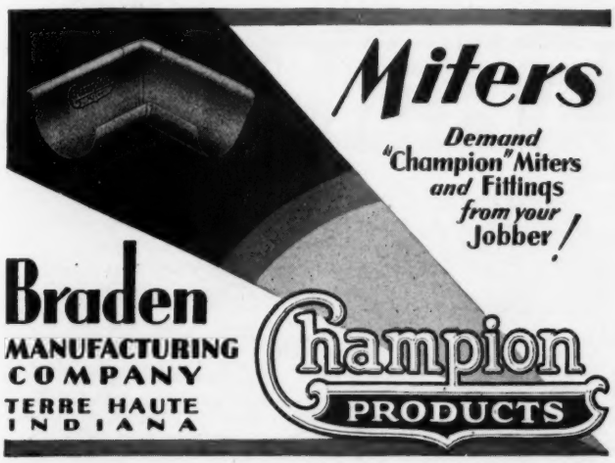

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Demand "Champion" Miters and Fittings from your Jobber!

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TERRE HAUTE INDIANA

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WATERBURY

***SEAMLESS* FURNACE**

REG. U.S. PAT. OFF PIPE OR PIPELESS

Is Guaranteed Permanently Gas-Tight

The Waterman-Waterbury Co.

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WHITNEY HANDY VISE

Here is an item that costs little but proves indispensable. This Vise is handy, practical, and securely holds any Whitney Lever Punch. Bolts to bench or can be bolted to plank and used portably. Weighs 5 lbs.

No. 8 CLOSE CORNER PUNCH

The No. 8 shown in vise has a capacity ¼-in. through ⅛-in. iron. Weighs 7⅛ lbs. Length 18½ inches. Depth of throat 2 inches. Simple, easy and quick punch changing. Side Gauge with marked fractional inches. Punches and dies 1/16 to 7/16 by 1/64 inch.

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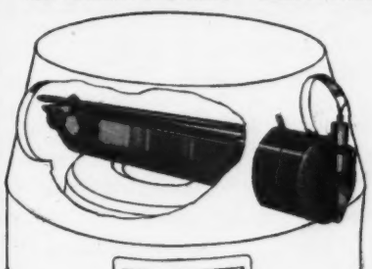

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IT'S TRULY AUTOMATIC

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Write for our dealer, jobber or manufacturer proposition.

SALLADA MANUFACTURING CO.

720 South 4th St., Minneapolis, Minn.

YOUNG REGULATOR

A Locking and Indicating Device for Air Conditioning and Ventilating Systems

Sectional view of wall showing damper

Controls the volume of air flow through duct—the simplest and most effective method of controlling and showing position of volume damper. Positively tamperproof. Made of rust-resisting metals. Exclusive patented features. Write for catalog.

THE YOUNG VENTILATING CO.

2703 Woodland Avenue · Cleveland, Ohio

BOTH HAVE FINS

LET US TELL YOU WHY!

HALL-NEAL FURNACE COMPANY

1324 Capitol Avenue Indianapolis, Indiana

Say you saw it in AMERICAN ARTISAN—Thank you!

~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy., No. 2	$17.50
Southern Fdy., No. 2	17.01
Lake Superior Charcoal	27.04
Malleable	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC	20x28 112 sheets	$23.80
IX	20x28	27.45
IXX	20x28 56 sheets	14.95
IXXX	20x28	16.10
IXXXX	20x28	17.35

TERNE PLATES

	Per Box
IC 20x28, 40-lb. 112 sheets	$22.50
IX 20x28, 40 lb. 112 sheets	25.00
IC 20x28, 25-lb. 112 sheets	19.60
IX 20x28, 25-lb. 112 sheets	22.10
IC 20x28, 20-lb. 112 sheets	18.25
IX 20x28, 20-lb. 112 sheets	20.75

"ARMCO" INGOT IRON PLATES

No. 8 ga.—110 lbs.	$4.15
3/16 in.—100 lbs.	4.05
¼ in.—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC, 20x28	12.75
Cokes, 135 lbs., base, IX, 20x28	14.75
Cokes, 155 lbs., base, 2X, 56 sheets	8.50
Cokes, 175 lbs., base, 3X, 56 sheets	9.35
Cokes, 195 lbs., base, 4X, 56 sheets	10.25

HOT ROLLED ANNEALED SHEETS

Base 10 ga.	per 100 lb.	$3.25
"Armco" 10 ga.	per 100 lbs.	4.15

HOT ROLLED ANNEALED SHEETS 16 GA. AND HEAVIER

No. 18	per 100 lbs.	$3.25
No. 20	per 100 lbs.	3.35
No. 22	per 100 lbs.	3.45
No. 24	per 100 lbs.	3.55
No. 26	per 100 lbs.	3.65
No. 27	per 100 lbs.	3.70
No. 28	per 100 lbs.	3.80

GALVANIZED

No. 16	per 100 lbs.	$3.70
No. 18	per 100 lbs.	3.80
No. 20	per 100 lbs.	3.90
No. 22	per 100 lbs.	4.00
(Standard differentials on extras to apply)		
No. 24	per 100 lbs.	$4.10
No. 26	per 100 lbs.	4.35
No. 27	per 100 lbs.	4.45
No. 28	per 100 lbs.	4.60
"Armco" 24	per 100 lbs.	5.75

BAR SOLDER

Warranted 50-50	per 100 lbs.	$19.25
45-55	per 100 lbs.	17.00
48-52	per 100 lbs.	17.75
Plumbers'	per 100 lbs.	15.50

ZINC

In Slabs	$5.00

SHEET ZINC

Cask Lots (600 lbs.)	$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Sheets, Chicago base	16 ½ c
Tubing, seamless, Chicago base	20 ⅝ c
Wire, Chicago base	16 c
Rods, Chicago base	13 ⅝ c

COPPER

Sheets, Chicago base	17 ⅞ c
Tubing, seamless, Chicago base	20 ⅝ c
Wire, plain rd., 8 B. & S. Ga. and heavier	12 ⅝ c

LEAD

American Pig	$6.00
Bar	7.50

TIN

Bar Tin	per 100 lbs.	$33.00
Pig Tin	per 100 lbs.	32.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6 ½ c per lb.
Mill board, 3/32 to ⅛	6 ½ c per lb.
Corrugated paper (250 sq. ft. per roll)	$4.25 per roll
Pipe joint tape, per 500 lineal feet	$1.50

ASBESTOS SEGMENTS

8 in.	per 25 sets	$1.50
9 in.	per 25 sets	1.75
10 in.	per 25 sets	2.00
12 in.	per 25 sets	2.50

CEMENT, FURNACE

5-lb. cans, net	$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper

No-Rivet Steel, with tail pieces, per gross	$8.25
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.00

COPPER FOOTING

Copper Footing	43 %

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B	Net

CUT-OFFS

Gal. plain, round or cor. rd.	
26 gauge	30 %
28 gauge	35 %

DAMPERS

Yankee Warm Air

7 inch, doz.	$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimpedge, crated	75-15 %
Zinc	60 %

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.	
28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Galvanized Terne Steel

Plain Rd. and Rd. Corr.	
28 gauge	60-10 %
26 gauge	50 %
24 gauge	15 %

Square Corrugated

28 gauge	55 %
26 gauge	40 %

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5 %
Nested solid	70 & 5 %

Sq. Corr., A. & B. & Octagon

28 gauge	55 %
26 gauge	40 %

Portico

1, 1¼, 1½ inch	45 %

Copper

16 oz., all designs	50 %

Zinc

All styles	60 %

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue No. 28 Gauge.	Doz.
5 inch	$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.	
5 inch	$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60 % off list.

FIRE POTS

	Each
No. 02 Gasoline Torch, 1 qt.	$ 5.13
No. 9250, Kerosene or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	3.60
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85 %
Single and Double Strength, B, all brackets	87 %

HANGERS

Conductor Pipe

Milcor Perfection Wire	25 %
Milcor Triplex Wire	10 %

Eeaves Trough

Steel (galv. after forming), from list	45 %
Selflock E. T. Wire, List	10 %

HOOKS

Conductor

"Direct Drive" Wrought Iron, for wood or brick	15 %

MITRES

Galvanized Steel Mitres	
28 gauge	70-15 %
26 gauge	70- 5 %

PASTE

Asbestos Dry Paste

200-lb. barrel	$15.00
100-lb. barrel	7.75
50-lb. pail	4.50
25-lb. pail	2.50
10-lb. bag	1.20
5-lb. bag	.60

PIPE

Galvanized

Crated and nested (all gauges)	75-12 ½ %
Crated and not nested (all gauges)	75-7 ½ %

Furnace Pipe

Double Wall Pipe and Fittings	60 %
Single Wall Pipe, Round Galvanized Pipe	60 %
Galvanized and Tin Fittings	60 %

Lead

Per 100 lbs.	$12.50

Stove Pipe
"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	$10.00
28 gauge, 6 inch U. C. nested	11.00
28 gauge, 7 inch U. C. nested	13.00
30 gauge, 5 inch U. C. nested	9.25
30 gauge, 6 inch U. C. nested	10.00
30 gauge, 7 inch U. C. nested	12.00

T-Joint Made Up

6-inch, 28 gauge	per doz.	$3.40

REGISTERS AND FACES

Floor Registers

Steel and Semi-Steel	40 & 10 %
All Cast Iron	20 %

Baseboard

2-Piece	40 & 10 %
1-Piece	40-10 & 20 %

Adjustable Ventilators

Adjustable Ventilators	40 & 10 %

COLD AIR FACES

Steel and Cast, less than 14" width	40 & 10 %
Steel, 14" and wider	65 & 10 %
Cast, 14" and wider	60 & 10 %
Special Cold Air Faces, Steel or Cast	40 & 10 %

RIDGE ROLL

Galv., Plain Ridge Roll, b'dld	75-15-5 %
Galv., Plain Ridge Roll, crated	75-15 %

SCREWS

Sheet Metal

7, ½ x ⅝, per gross	$0.52
No. 10, ¾ x 3/16, per gross	0.68
No. 14, ⅞ x ¼, per gross	0.83

SHEARS, TINNERS' AND MACHINISTS'

Viking	$22.00

Lennox Throatless

No. 18	35 %
Shear blades	10 %
(F.o.b. Marshalltown, Iowa)	

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60-10 %
26 gauge, round flat crimp	50 %
24 gauge, round flat crimp	15 %

SNIPS

Tinners'	Net

VENTILATORS

Standard	30 to 40 %
Milcor	Net

USE LESS PASTE

AND DO A BETTER JOB WITH
NON-CON-DUX
ASBESTOS PAPER

It's tough when it's wet - -
and
It's white when it's dry - -

GRANT WILSON, INC.
4101 West Taylor Street
Chicago, Illinois

OIL HEAT

LACO

Amazing New Features and Low Price

IMAGINE an oil burner that burns oil or gas at a fraction of former costs! The Laco Patented Mineral Wick does it. Now equipped with NEW REMOVABLE WICK CHAMBER, new control valves, a wider range capacity, new wick type air flue orifice, increased heating capacity, and new flame control, at the lowest price in the history of oil burners. No tearing up the furnace or breaking in the fire bowl. Exceptionally fine for cast iron furnaces.

Automatic control. 26 Models. Every burner tested in the factory. You make full dealer profit on every sale. Write today for amazing offer.

Dealers Wanted

Write today for full information how you as a dealer can make from $5,000 to $50,000 a year selling the complete Laco line. The heating season is at hand. Act at once. Write or wire today.

Laco Mineral Wick (with removable chamber) that changes oil into gas, also will burn natural or manufactured gas.

Listed as Standard by Underwriters Laboratories

LACO OIL BURNER CO.

6831 Union St. Griswold, Iowa, U. S. A.

"America's perfect heating unit"

The improved **1931**

MELLOW FURNACE

with features which make selling easy—

Main sections extending through front. | Fitted with disc-ground doors. | Hot blast smoke consumer is regular equipment.

DUPLEX GRATE

Many Other Superior Features

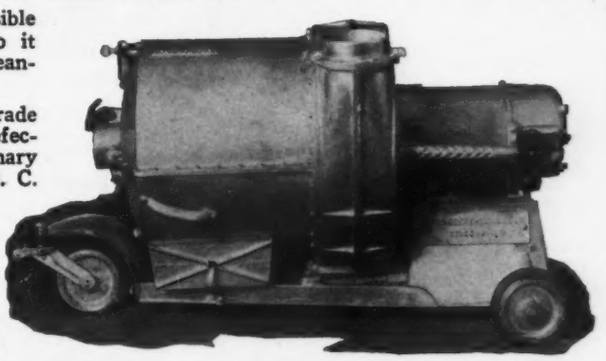
LIBERTY FOUNDRY COMPANY
7600 Vulcan Street St. Louis, Mo.

"D-Q" The MOST POWERFUL Suction Cleaner Made

THE extra power of the "D-Q" Cleaner makes it possible for you to do a REAL CLEANING job and to do it QUICKER. With the "D-Q" you can actually make the cleaning job itself pay you a profit.

It's *light weight*—made of highest grade cast aluminum—*guaranteed* against defective parts and it operates in *any* ordinary house lighting socket either A. C. or D. C. current from 110 to 125 volts.

Write today for our NEW four page folder which illustrates and describes the "D-Q" Super Suction Cleaner in detail.



DENSMORE-QUINLAN CO.
KENOSHA WISCONSIN

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Air Cleaners

American Fdy. & Furnace Co., Bloomington, Ill.
Independent Air Filter Co., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Meyer & Bro., F., Peoria, Ill.
Watt Mfg. Co., Sterling, Ill.

Air Washers

American Machine Products Co., Marshalltown, Iowa
Brundage Co., Kalamazoo, Mich.
A. Gehri & Co., Tacoma, Wash.
Watt Mfg. Co., Sterling, Ill.

Asbestos—Liquid

Technical Products Co., Pittsburgh, Pa.

Asbestos Covering

Standard Asbestos Co. of Chicago, Chicago, Ill.
Wilson, Grant, Inc., Chicago, Ill.

Asbestos Paper

Standard Asbestos Co. of Chicago, Chicago, Ill.
Wilson, Grant, Inc., Chicago, Ill.

Ash Sifter

Diener Mfg. Co., G. W., Chicago, Ill.

Blast Gates

Berger Bros. Co., Philadelphia, Pa.

Blowers

American Fdy. & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Iowa
Brundage Co., Kalamazoo, Mich.
Emerson Elec. Mfg. Co., St. Louis, Mo.
A. Gehri & Co., Tacoma, Wash.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lakeside Co., Hermansville, Mich.
Watt Mfg. Co., Sterling, Ill.

Bolts—Stove

Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Brakes—Bending

Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Brakes—Cornice

Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Cans—Garbage

Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Castings—Malleable

Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Chaplets

Fanner Mfg. Co., Cleveland, Ohio

Cleaners—Vacuum

Baker Furnace Co., Toledo, Ohio
Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brillion, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
Osborn Co., The J. M., & L. A., Cleveland, Ohio

Conductor Elbows and Shoes

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Conductor Fittings

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
David Levow, New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rival Strap Corp., New York, N. Y.

Conductor Pipe

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Cornices

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Crimping Machines

Bertsch & Co., Cambridge City, Ind.
Yoder Co., The, Cleveland, Ohio

Cut-offs—Rain Water

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Dampers—Quadrants—Accessories

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Aeolus Dickinson, Chicago, Ill.
Hart & Cooley Co., Holland, Mich.
Howes Co., S. M., Boston, Mass.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York, N. Y.
Young Ventilating Co., Cleveland, Ohio

Dampproofings

Lastik Products Corp., Pittsburgh, Pa.

Diffusers—Air Duct

Aeolus Dickinson, Chicago, Ill.

Drills—Electric

J. M. & L. A. Osborn Co., Cleveland, Ohio

Drive Screws—Hardened Metallic

Parker-Kalon Corp., New York

Eaves Trough

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Eaves Trough Hangers

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Fans—Exhaust

Emerson Elec. Mfg. Co., St. Louis, Mo.

Fans—Ventilating

Emerson Elec. Mfg. Co., St. Louis, Mo.

Fluxes—Soldering

Kester Solder Co., Chicago, Ill.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Forming Rolls

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Furnace Cement

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Technical Products Co., Pittsburgh, Pa.

Furnace Chain

Hart & Cooley Co., Holland, Mich.

Furnace Cleaners—Suction

Baker Furnace Co., Toledo, O.
Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brillion, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
J. M. & L. A. Osborn Co., Cleveland, Ohio

Furnace Door Handles

Fanner Mfg. Co., Cleveland, Ohio

Furnace Fans

A-C Mfg. Co., Pontiac, Ill.
American Fdy. & Furnace Co., Bloomington, Ill.
Emerson Elec. Mfg. Co., St. Louis, Mo.
Robinson Co., A. H., Massillon, Ohio

Furnace Filters

Independent Air Filter Co., Chicago, Ill.
Kleenaire Filter Co., Stevens Point, Wis.
Lakeside Co., Hermansville, Mich.

Furnace Pipe and Fittings

Henry Furnace & Fdy. Co., Cleveland, Ohio
Meyer & Bro., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peerless Foundry Co., Indianapolis, Ind.
Williamson Heater Co., Cincinnati, Ohio

Furnace Pokers

Fanner Mfg. Co., Cleveland, Ohio

Furnace Pulleys

Hart & Cooley Co., Holland, Mich.

Furnace Regulators

Hart & Cooley Co., Holland, Mich.
Lakeside Co., Hermansville, Mich.
Modern Heat Regulator Co., Cleveland, Ohio
Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
White Mfg. Co., Minneapolis, Minn.

Furnace Rings

Forest City Foundries Co., Cleveland, Ohio

Furnaces for Gas or Oil

Dail Steel Products Co., Lansing, Mich.

Furnaces—Gas

American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Henry Furnace and Foundry Co., Cleveland, Ohio
Lennox Furnace Co., Marshalltown, Iowa
Meyer Furnace Co., Peoria, Ill.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Robinson Co., A. H., Massillon, Ohio
Wise Furnace Co., Akron, Ohio
Western Steel Products Co., Duluth, Minn.

Furnaces—Gas Auxiliary

Forest City Foundries Co., Cleveland, O.

Furnaces—Oil Burning

Motor Wheel Corp., Heater Div., Lansing, Mich.

Furnaces—Warm Air

Acme Tin Plate & Rfg. Supply Co., Philadelphia, Pa.
Agricola Furnace Co., Gadsden, Ala.
American Fdy. & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Armstrong Furnace Co., Columbus, O.
Brillion Furnace Co., Brillion, Wis.
Dail Steel Products Co., Lansing, Mich.
Deshler Foundry & Machine Works, Deshler, Ohio
Economy Baler Co., Ann Arbor, Mich.
Enterprise Boiler & Tank Works, Chicago, Ill.
Forest City Foundries Co., Cleveland, Ohio
General Heating Co., St. Paul, Minn.
Graff Furnace Co., Scranton, Pa.
Hall-Neal Furnace Co., Indianapolis, Ind.
Henry Furnace & Fdy. Co., Cleveland, Ohio
International Heater Co., Utica, N. Y.
Lennox Furnace Co., Marshalltown, Iowa
Liberty Foundry Co., St. Louis, Mo.
May Fiebeger Furnace Co., Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Midland Furnace Co., Columbus, Ohio
Motor Wheel Corp., Heater Div., Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co. Mt. Vernon, Ill.
Payne Furnace & Supply Co. Beverly Hills, Calif.
Peerless Foundry Co., Indianapolis, Ind.
Premier Warm Air Heater Co., Dowagiac, Mich.
Rybolt Heater Co., Ashland, Ohio
Schwab Furnace & Mfg. Co., Cedar Grove, Wis.
Standard Fdy. & Furnace Co., De Kalb, Ill.
U. S. Furnace Co., Youngstown, Ohio
Waterman-Waterbury Co., Minneapolis, Minn.
Western Steel Products Co., Duluth, Minn.
Williamson Heater Co., Cincinnati, O.
Wise Furnace Co., Akron, Ohio

Grilles

Auer Register Co., Cleveland, Ohio
Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Chicago, Ill.
Independent Register & Mfg. Co., Cleveland
Tuttle & Bailey Mfg. Co., New York
U. S. Register Co., Battle Creek, Mich.

Guards—Machine and Belt

Harrington & King Perforating Co., Chicago, Ill.

Handles—Boiler

Berger Bros. Co., Philadelphia, Pa.

Handles—Soldering Iron

Parker-Kalon Corp., New York, N. Y.

Heat Regulators

Hart & Cooley Mfg. Co., Chicago, Ill.
Modern Heat Regulator Co., Cleveland, Ohio
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
White Mfg. Co., Minneapolis, Minn.

Heaters—Cabinet

Motor Wheel Corp., Heater Division. Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Waterman-Waterbury Co., Minneapolis, Minn.

Heaters—School Room

Meyer Furnace Co., The, Peoria, Ill.
Western Steel Products Co., Duluth, Minn.
Waterman-Waterbury Co., Minneapolis, Minn.

Humidifiers

Automatic Humidifier Co., Cedar Falls, Iowa
Diener Mfg. Co., G. W., Chicago, Ill.
Meyer & Bro. Co., F., Peoria, Ill.
Lakeside Co., Hermansville, Mich.
Sallada Mfg. Co., Minneapolis, Minn.

(Continued on page 48)

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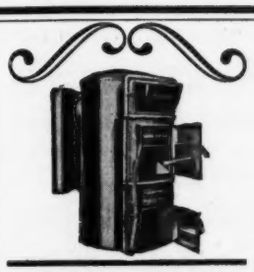
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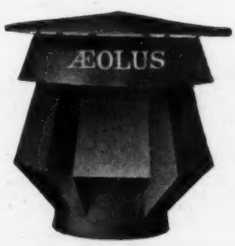

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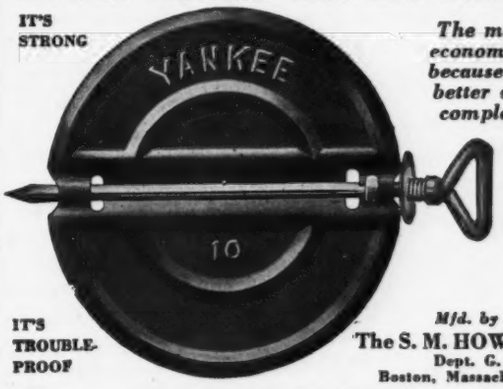

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(Continued from page 46)

Machinery—Culvert

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Machinery—Rebuilt

Interstate Machinery Co., Chicago, Ill.

Machines—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Yoder Co., The, Cleveland, O.

Metal Lath—Expanded

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Miters

Barnes Metal Products Co., Chicago, Ill.
Berger Bros Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Motors—Electric

Emerson Elec. Mfg. Co., St. Louis, Mo.

Nails—Hardened Masonry

Parker-Kalon Corp., New York, N. Y.

Oil Burners

Bock Oil Burner Corp., Madison, Wis.
Laco Oil Burner Co., Griswold, Iowa
McIlvaine Burner Corp., Evanston, Ill.
Northern Oil Burners Inc., Minneapolis, Minn.
Silent Automatic Corp., Detroit, Mich.

Paint

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Perforated Metals

Chicago Perforating Co., Chicago
Harrington & King Perforating Co., Chicago, Ill.

Punches

Bertsch & Co., Cambridge City, Ind.
Hyro Mfg. Co., New York
Interstate Machinery Co., Chicago, Ill.
Ryerson, & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand

Parker-Kalon Corp., New York, N. Y.

Punches—Hand

Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty-Stove

Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets

Hart & Cooley Co., New Britain, Conn.
Tuttle & Bailey Mfg. Co., New York

Registers—Warm Air

Auer Register Co., Cleveland, Ohio
Forest City Foundries Co., Cleveland, Ohio
Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Register & Mfg. Co., Cleveland, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Rock Island Register Co., Rock Island, Ill.
Symonds Register Co., St. Louis, Mo.
Tuttle & Bailey Mfg. Co., New York
United States Register Co., Battle Creek, Mich.
Williamson Heater Co. Cincinnati, Ohio

Registers—Wood

American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Repairs—Stove and Furnace

Brauer Supply Co., A. G., St. Louis, Mo.

Ridging

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Roofing Cement

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roof Flashing

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Roof Paints

Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roofing—Iron and Steel

Globe Iron Roofing and Corrugating Co., Cincinnati, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., The, Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Roofing—Tin and Terne

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Rubbish Burners

Hart & Cooley Co., Holland, Mich.

School—Sheet Metal Pattern Drafting

St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating

St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York

Screens—Perforated Metal

Harrington & King Perforating Co., Chicago, Ill.

Scuppers

Aeolus Dickinson, Chicago, Ill.

Shears—Hand and Power

Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Viking Shear Co., Erie, Pa.
Yoder Co., The, Cleveland, O.

Sheet Metal Screws—Hardened, Self-Tapping

Parker-Kalon Corp., New York

Sheets—Alloy

Inland Steel Co., Chicago, Ill.
International Nickel Co., New York, N. Y.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Aluminum

J. M. & L. A. Osborn Co., Cleveland, Ohio

Sheets—Black and Galvanized

Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Copper

American Brass Co., Waterbury, Conn.
Revere Copper and Brass Inc., Rome, N. Y.

Sheets—Iron

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Copper Bearing Steel

Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio

Sheets—Nickel

International Nickel Co., New York

Sheets—Pure Iron Copper Alloy

Newport Rolling Mill Co., Newport, Ky.

Sheets—Special Finish

Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio

Shingles and Tiles—Metal

Globe Iron Roofing and Corrugated Co., Cincinnati, O.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Sky Lights

Globe Iron Roofing and Corrugated Co., Cincinnati, O.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Snips

Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Snow Guards

Berger Bros. Co., Philadelphia, Pa.
David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Solder

Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Solder—Acid Core

Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Rosin Core

Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing

Kester Solder Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Soldering Furnaces

Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware

Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning

Fanner Mfg. Co., Cleveland, Ohio

Stove Pipe and Fittings

Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

Stove and Furnace Trimmings

Fanner Mfg. Co., Cleveland, Ohio

Strainers—Roof

David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Straps—Ornamental Pipe

David Levow, New York, N. Y.
Rival Strap Corp., New York, N. Y.

Tinplate

Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio

Tools—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches

Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Vacuum Cleaners—Furnace

Baker Furnace Co., Toledo, O.
Breuer Electric Mfg. Co., Chicago
Brillion Furnace Co., Brillion, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
J. M. & L. A. Osborn Co., Cleveland, Ohio

Ventilators—Ceiling

Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Independent Reg. & Mfg. Co., Cleveland, O.

Ventilators—Floor

Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof

Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, O.
Paul R. Jordan & Co., Indianapolis, Ind.
Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

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American Wood Register Co., Plymouth, Ind.
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Milcor Steel Co., Mil., Canton, Chgo., La Crosse, K. C.

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Classified Advertising

BUSINESS CHANCES

Lightning Rods—Dealers who are selling Lightning Protection will make money by writing to us for our latest Factory to Dealer Prices. We employ no salesmen and save you all overhead charges. Our Pure Copper Cable and Fixtures are endorsed by the National Board of Fire Underwriters and hundreds of dealers. Write today for samples and prices. L. K. Diddle Company, Marshfield, Wis.

For Sale—Best equipped sheet metal, heating and plumbing shop in eastern Nebraska. Established and under same management for thirty years. County seat town of 4000. Only shop in town. Would consider selling half interest to young man that is a thorough mechanic and has ability to canvass and install work. The opportunity of a life time for such a man. Address Box 751, Plattsmouth, Nebraska. E-539

For Sale—Small hardware store and building. Kansas town of 500 population. Good farming community. Building and stock, about $7500. For full particulars, write F-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Sheet metal and furnace business. A going business. Reason for selling, retiring. Near St. Louis, Missouri. Price, $800 cash complete. Address R-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

For Sale—Sheet metal shop in southwest Kansas. Must sell on account of sickness. Address Dodge City Sheet Metal Works, 307 Santa Fe Trail, Dodge City, Kansas. Z-539

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WANTED

National distributor of Hardware, Implements, Plumbing, Heating, Paints, etc., with many stores, offers opportunity for permanent employment to men who have operated or been employed in Hardware Stores handling above lines.

Must be able to plan and estimate plumbing and heating jobs and also handle ALL other duties connected with the *successful* operation of a country Hardware Store.

Write in confidence giving all details, including age, names of former employers and past and present salary.

Address A-539
AMERICAN ARTISAN
139 N. Clark St. Chicago, Ill.

Manufacturer of high grade steel furnaces wants strictly commission salesman to cover all or part of New York State. Liberal commission promptly paid. Some established trade. Address L-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Wanted—A good retail furnace salesman to manage our branch at Zanesville, Ohio. Must be capable to figure and lay out own jobs. Prefer man who can also do own installing. Have plenty of live prospects to work on. Commission basis. Wonderful opportunity for the man who knows the furnace business and is willing to work. Address P. O. Box 647, Zanesville, Ohio. P-539

SITUATION WANTED

Situation Wanted—By first class tinner and plumber with 28 years experience. Can also do any kind of work that comes into a shop. Experienced in steel ceiling, pump and windmill work. Can furnish references. Address F. C. Blewett, Dodgeville, Wisconsin. Y-538

Situation Wanted—By first class tinner and sheet metal worker. Can do plumbing and heating and all kinds of shop work. Iowa or Illinois preferred. Address C-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Competent plumber and steam fitter, good on furnace and sheet metal work, will take small town position. Refined gentleman, 42 years old, and in good health. Address Plumber, 4632 Second Boulevard, Detroit, Michigan. K-539

Situation Wanted—Plumber, steam fitter, and tinner would like position with a good party or company. Can give best of references as to ability either at installing or handling the work. Don't mind working and will not lay down on the job. Am a lead working plumber, twenty years experience at this line of work. Address C. G. Perrin, Clifton, Wyoming. H-539

Situation Wanted—By all around sheet metal worker. Can do heating, ventilating, blow piping and fan installation work. Can do all work from blueprints. Good on any class of work that comes in a contract shop. 21 years in or with two shops. Address, D. Sigmon, 1618 East Washington Street, Indianapolis, Indiana. J-539

Situation Wanted—By combination radiator and sheet metal mechanic. Nine years' experience on all makes of auto, truck, tractor, combine and airplane radiators. Four years' experience in all kinds of sheet metal work, slate and tile roofing. State wages, hours, and whether work is steady year round or not in your reply. Address W. F. McLester, Box 213, Rockingham, N. C. A-540

Situation Wanted—By a first class all around sheet metal worker with 25 years at the trade. Can handle any kind of a job that may come to any job shop. Can also read blueprints, lay out patterns, and figure work. Can go any place. Address Geo. Collins, 417 Jones Street, Clearwater, Florida. O-539

SITUATION WANTED

Situation Wanted—Engineer desires connection with progressive manufacturer now planning to make a completely automatic air conditioning unit. Experienced in sales promotion and advertising. Graduate engineer. 6 years' experience. Would consider connection with progressive contractor. Address C-540, care AMERICAN ARTISAN, 139 N. Clark Street, Chicago.

Situation Wanted—By an all around handy man. Can do plumbing, steam fitting, tin work, electric wiring, and can also help in a hardware store. Have had sixteen years experience. Address S-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By a young man experienced in sheet metal, plumbing and hardware. Salary is secondary to a steady job with a reliable concern. Can furnish best references. Address O. J. Farus, Juda, Wisconsin. T-539

Situation Wanted—By first class sheet metal worker, tinner and furnace man. Would like to connect with some firm in North Iowa or south Minnesota which is planning on selling in a year or two, with the privilege of buying. Best of references. Address W-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—By experienced sheet metal foreman. Capable mechanic in all lines. Can cut patterns and estimate. Have handled large government and state jobs. Address X-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

Situation Wanted—Sheet Metal salesman. Experienced. Acquainted and know the sheet metal and furnace dealers in Iowa and Northern Illinois. References and bond. Address Y-539, AMERICAN ARTISAN, 139 North Clark Street, Chicago, Illinois.

TOOLS AND MACHINES

For Sale—One No. 105 Oster Bull Dog Die Stock and dies, cuts 1½ to 3" pipe. First check for five dollars gets it. Address Warren Plumbing and Heating Co., Warren, Ill. B-540

SHEET METAL MACHINERY

COMPLETE STOCKS: NEW—USED—HAND—POWER
THIS WEEK'S SPECIALS

36 x 2 Roll	$ 19.50
8' 18 ga. Brake	100.00
Chicago Steel Slitter	8.00
½ HP B.B. Elec. Grinder	25.00

Send Us Your Inquiries
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Rolls—Shears—Brakes—Wiring — Folders — Stakes — Drills — Turning — Burring Machines — Punches, Etc.

WE BUY—SELL—EXCHANGE

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NEW AIR CONDITIONING

Is spreading like wild fire. The public in general are asking about it—people want to know how it will serve them in comfort, satisfaction, and to have something on the Jones's, etc.

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The INSTITUTE has specialized air conditioning courses for Forced Warm Air Plants, also large Mechanical Systems, etc. It is the ideal thing for Shop Owners, their Sons, Partners, etc., to prepare NOW to be good Salesmen later. Please indicate your desires:

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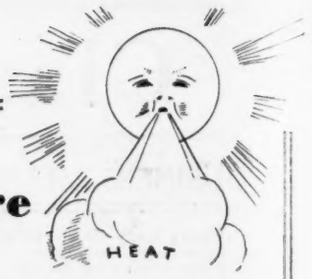
You—just as many other progressive furnace men—can reap a rich sales harvest with the New, Improved RYBOLT . . . because it enables you to offer your prospects more for their money. Quality throughout, a well-known name that identifies dependability, advanced features found only in costlier heating systems, and an attractive price that people can afford to pay—make the New RYBOLT the unmatched leader in the furnace field.

Write or wire for details for our interesting proposition

THE RYBOLT HEATER COMPANY

ASHLAND, OHIO

CINCINNATI **INDIANAPOLIS**



Let the Temperature RISE—

Heat Won't Affect—

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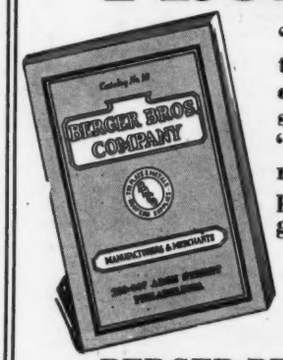

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(Sold by Leading Jobbers everywhere)

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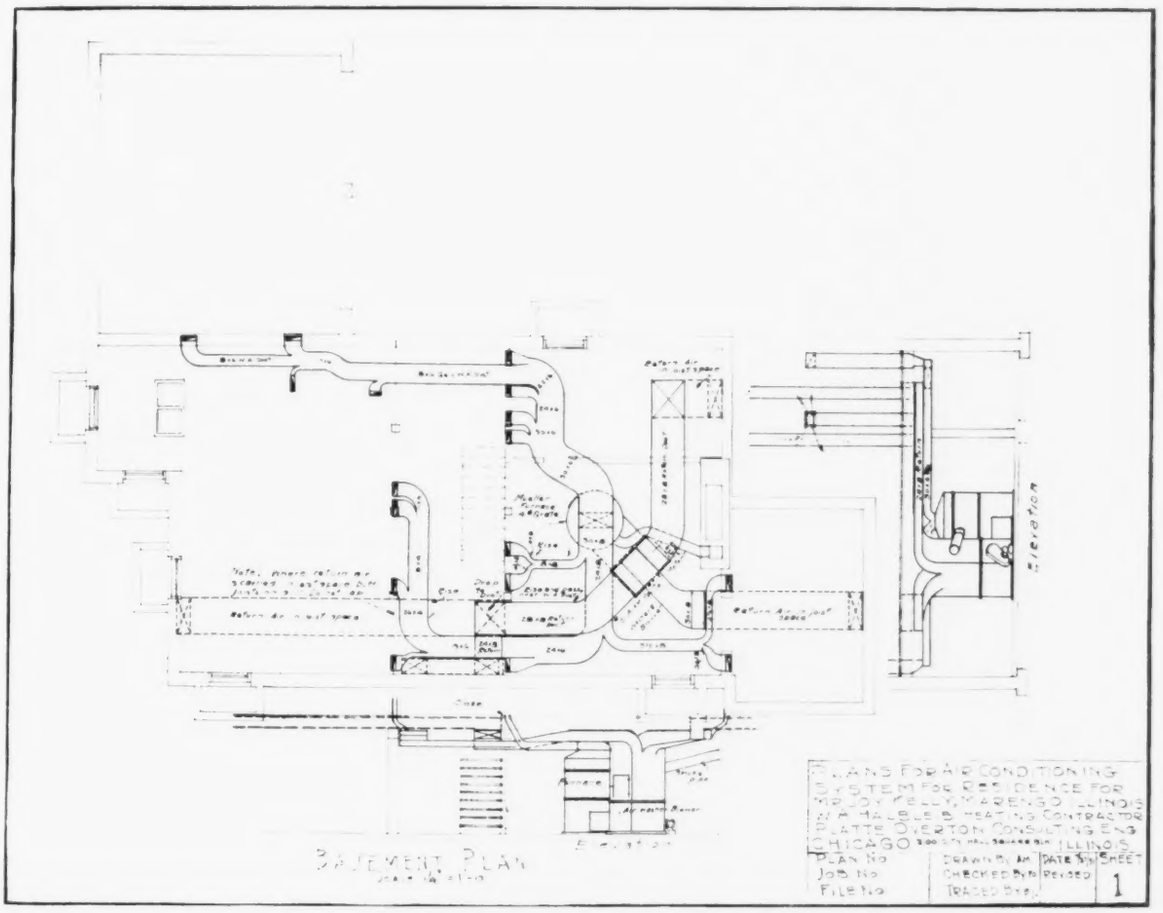
HERE IS PROOF!

Engineering Service that is Prompt–Accurate–Reasonable in Price

This plan was received Saturday, July 25, at 10 A. M.

Finished plans were mailed Monday, July 27, at 2 P. M.

This eleven room house was *completely designed* for $11.25.



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Up to and including 5 rooms $1.10 per room
5 to 9 rooms inclusive $1.00 per room
10 to 15 rooms inclusive $0.85 per room
16 to 20 rooms inclusive $0.80 per room
21 rooms and over $0.75 per room

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Up to and including 50,000 cu. ft. gross content $0.12 per 1,000 cu. ft.
50,000 cu. ft. and over $0.10 per cu. ft.

SCHOOLS

20,000 to 50,000 cu. ft. $0.30 per 1,000 cu. ft.
50,000 to 70,000 cu. ft. $0.25 per 1,000 cu. ft.
70,000 to 100,000 cu. ft. $0.20 per 1,000 cu. ft.
100,000 cu. ft. and over $0.15 per 1,000 cu. ft.

FACTORIES, GARAGES

Duct systems—$0.12 per 1,000 cu. ft. gross content.
Unit heater systems—$0.10 per 1,000 cu. ft. gross content.

SPECIAL NOTE

Where heating systems include filters, washers, temperature control as EXTRA EQUIPMENT—add 20 per cent to listed prices.

Where filters, washers, temperature controls are A PART OF THE HEATER AND ARE UNDER ONE CASING—listed prices apply.

For complete working plans detailing all trunk lines in ¼-inch scale and showing details of elbows, stacks, branches, sections, cross sections of walls—add 50 per cent to list prices.

Add $0.01 per square foot of direct radiation for combination systems.

HOW TO USE THIS SERVICE

Send architect's plans. If you must send sketches, these should be as complete as possible and show dimensions of building, rooms, ceiling heights, locations of doors and windows. Show all floors, glass areas, type of construction, compass points, direction of prevailing winds. In short, show all items considered in Standard Code calculations.

The More Complete the Information—the Better the Layout

Include with your plans all information about the equipment you expect or would like to use. I DO NOT SELL OR RECOMMEND ANY PARTICULAR EQUIPMENT!

List separately or send as a letter all peculiarities of the building, all owner's preferences such as furnace location, possible future additions, special room conditions such as especially high temperatures, etc.

Be sure to mail all material first class.

Terms are cash on receipt of the plans.

PLATTE OVERTON *Consulting Engineer* **2100 City Hall Square Bldg., Chicago**

Now an AIR CONDITIONING *system all in* ONE *unit—for the average home*

THE **Health-Air Conditioner** combines into a single unit occupying but little floor space, the four different independent units used in old-style conditioning systems. It works in conjunction with any type or size of heating system and is built in five sizes to fit any job.

This four-in-one unit consists of:

1. **A squirrel caged, positive type "blower"** which circulates the air completely through the house every ten minutes.
2. **An efficient "air washer"** that actually washes the germ-laden dust from the air.
3. **A "humidifier"** in winter.
4. **A "de-humidifier"** and air cooler in summer.

PATENTED ADJUSTABLE FRONT PERMITS EASY REPLACENENTS

The special design of the Health-Air Heating unit makes it easy to install in old furnace jacket without disturbing heating pipes. The cost of replacing old furnaces with this modern heating system, built specially for gas or oil burners, is little more than the cost of preparing the old furnace for an oil burner.

THE HEALTH-AIR FURNACE IS DESIGNED ESPECIALLY FOR OIL AND GAS BURNERS

Any furnace in which it is possible to burn coal must necessarily have a short flue travel to carry off the smoke and soot—and with this goes 50% of the heat.

The Health-Air Heating unit has fully three times the radiating surface of the ordinary furnace and consequently operates with an average efficiency well over 80% —as compared to the efficiency of the average furnace, which is only 40 to 45%. *Health-Air cuts oil consumption 25 to 50%!*

ECONOMY BALER COMPANY 1005 N. Main St. ANN ARBOR

HEALTHAIR (By Actual Test) Cuts Oil Consumption 25 to 50 Per Cent

DEALERS: OUR PROPOSITION WILL SURPRISE YOU.

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Warms in Winter—Cools in Summer

Health-Air Division, Economy Baler Company,
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Send us full details on your dealers' proposition.

MAIL THIS COUPON

Name_____

Address_____

Do you handle an oil burner? _____ What make? _____